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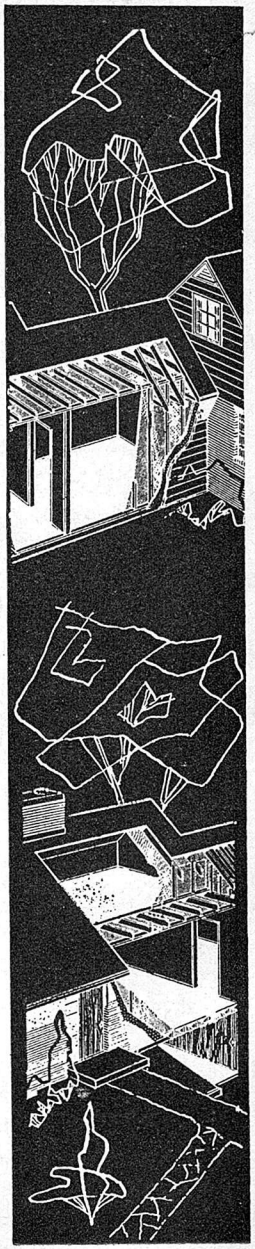

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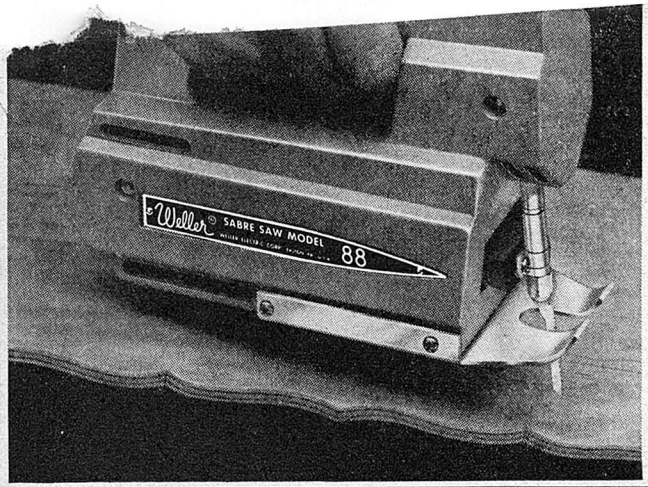

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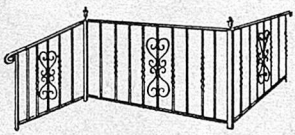

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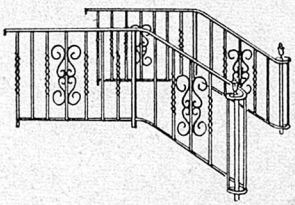

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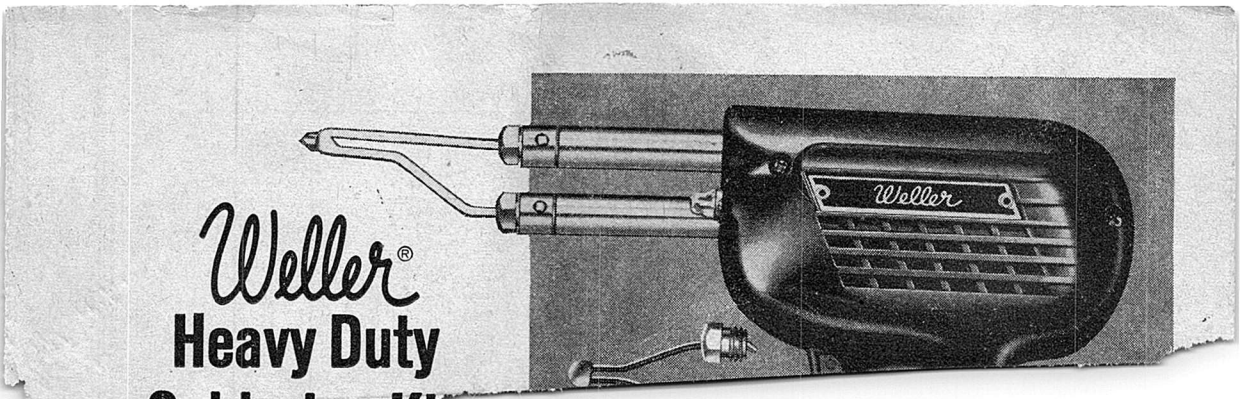

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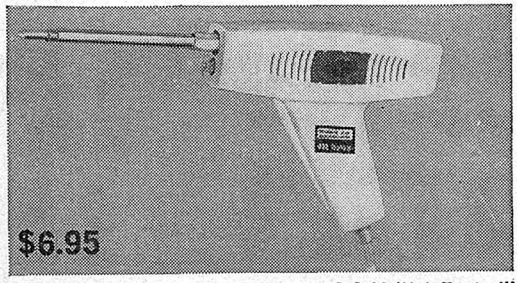

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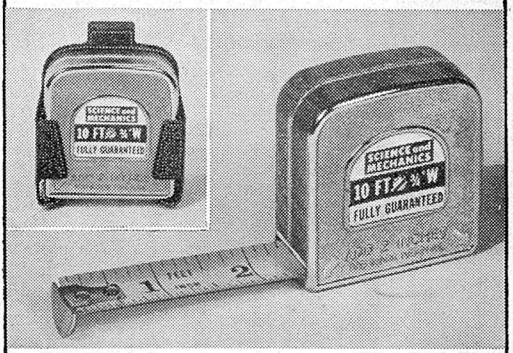

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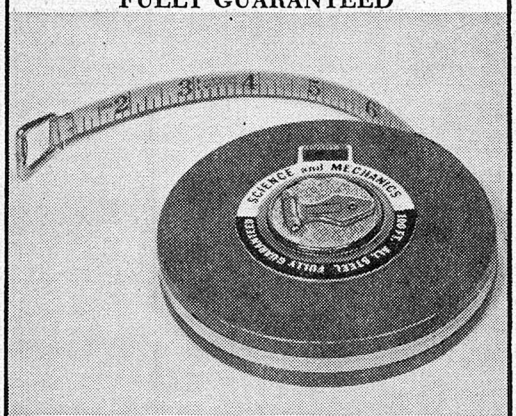

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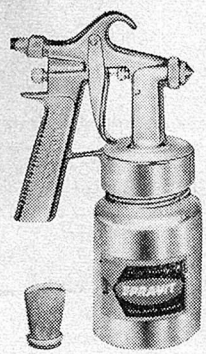

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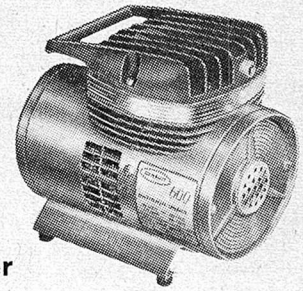

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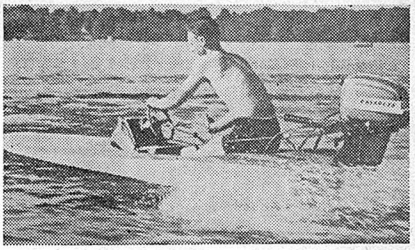

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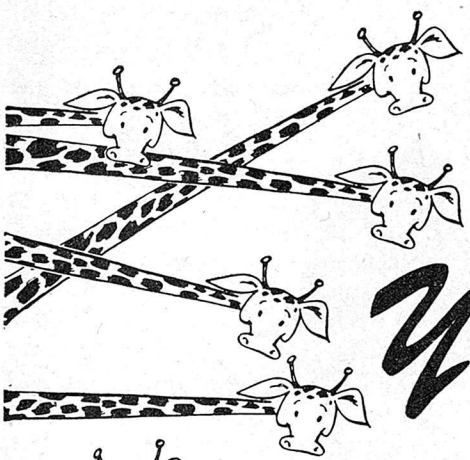

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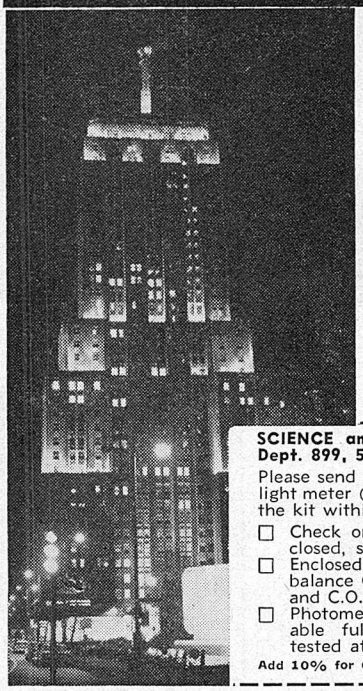

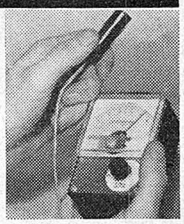

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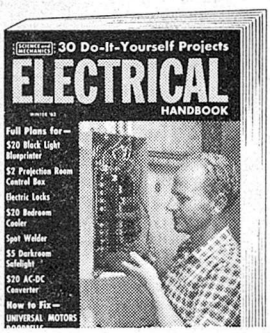

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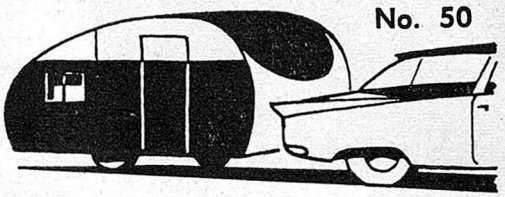

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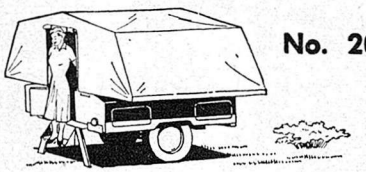

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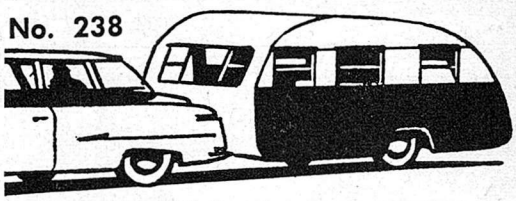

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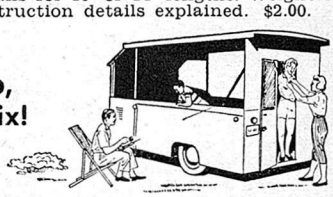

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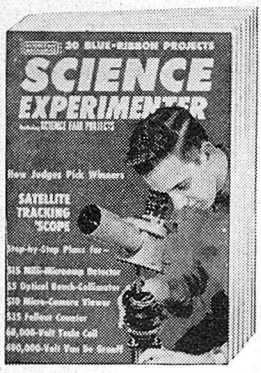

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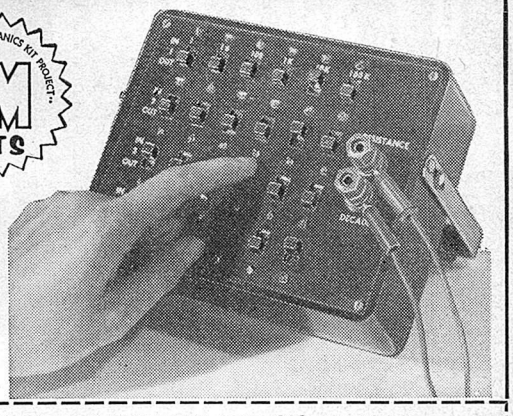

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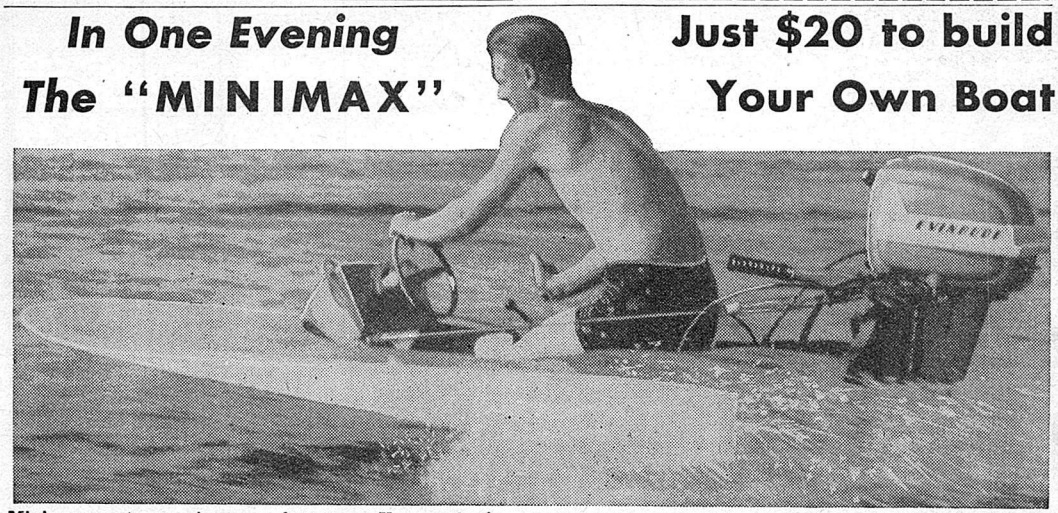

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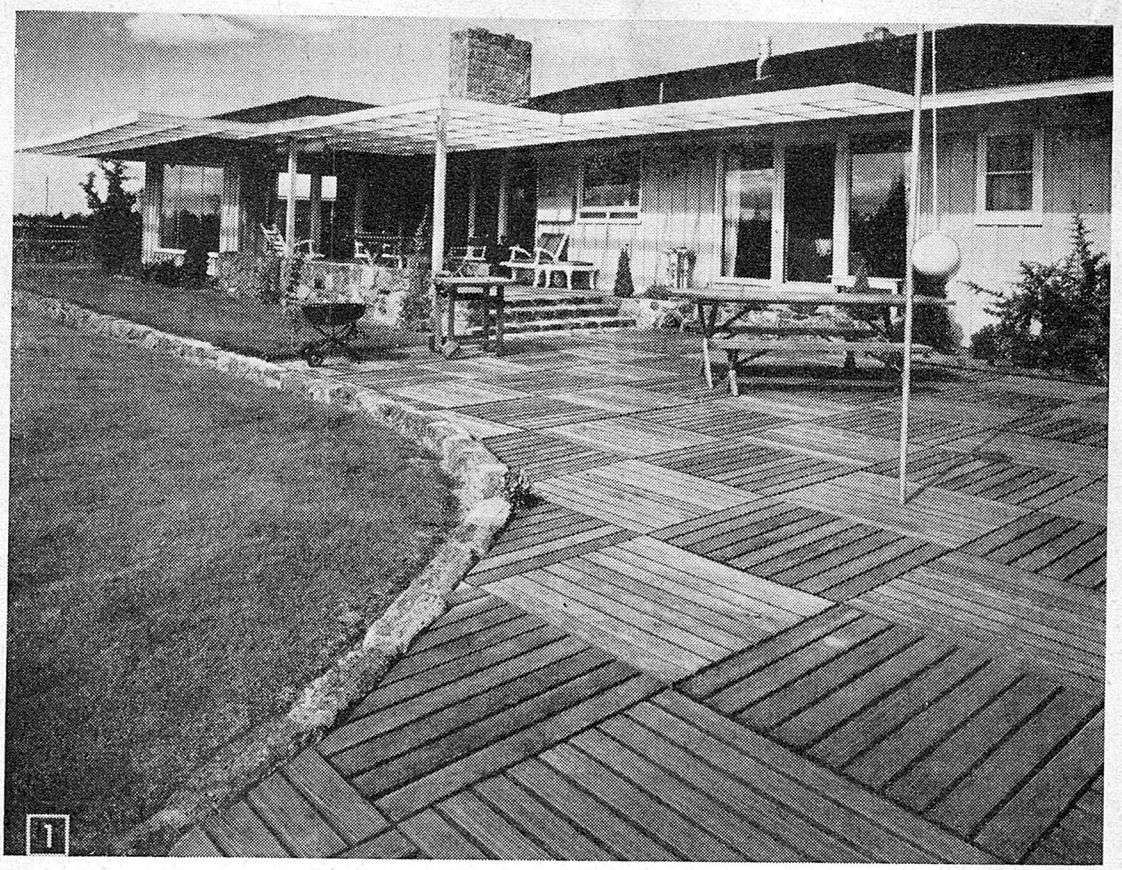
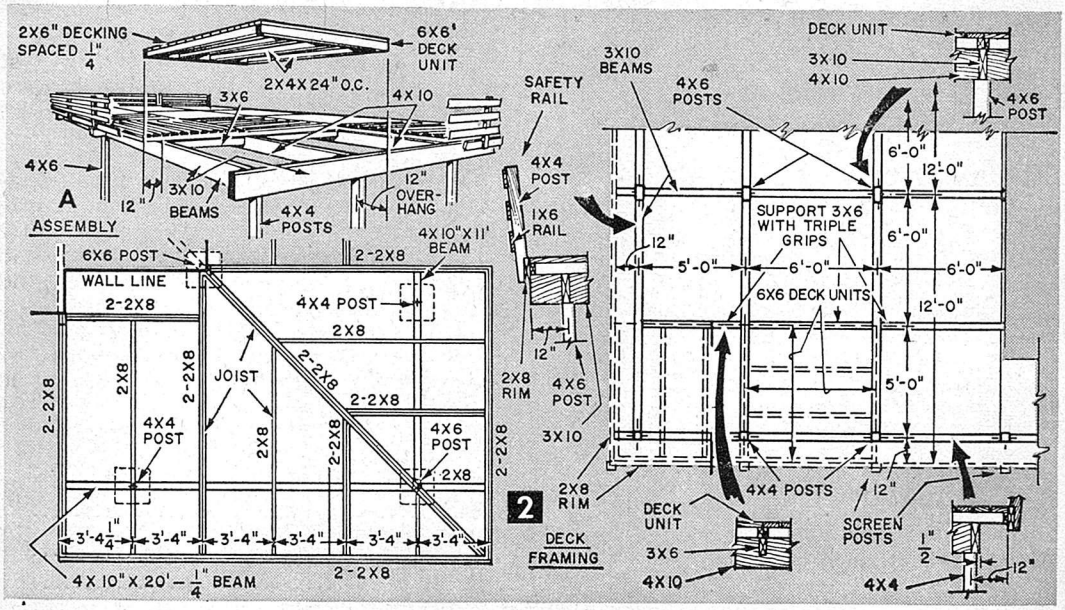
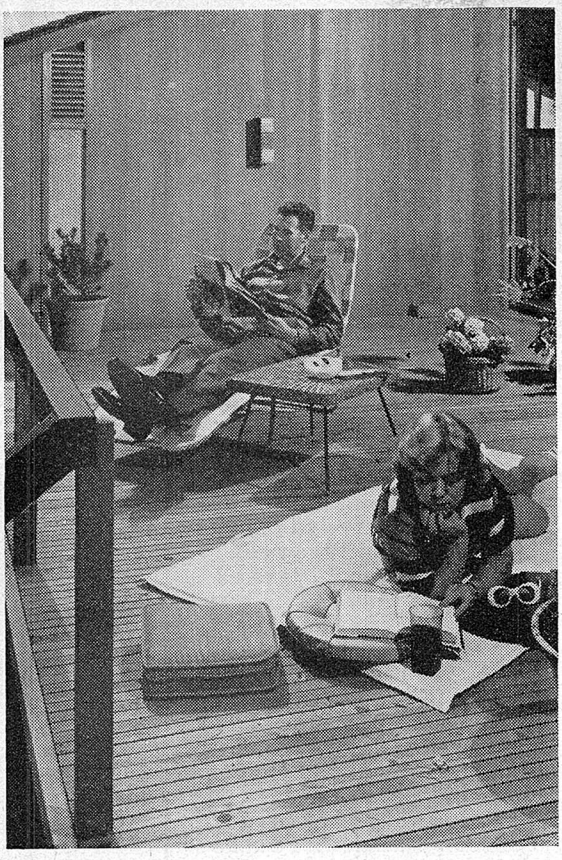
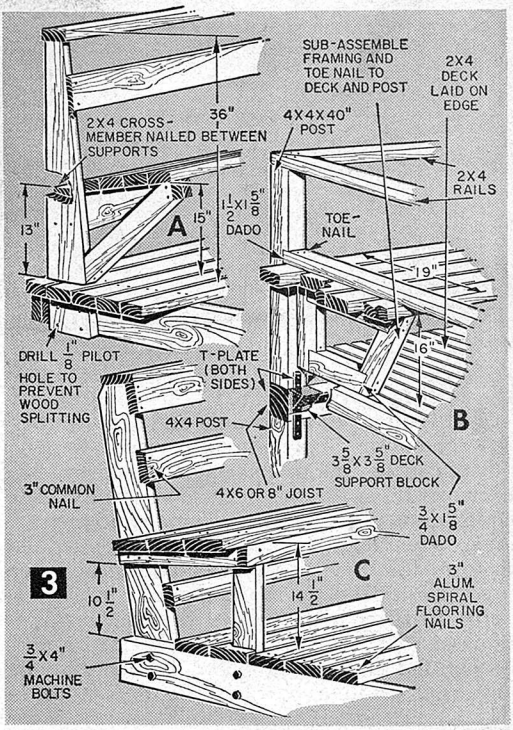


Indoor Living on an Outdoor







Deck

By TONY MASTEY

Whether it's part of the house or is an "island" in your garden, a deck should be designed to increase both living space and livability

WOODEN decks enable you to convert steep banks, hills, a sharp backyard incline, or part of the yard into an area that gives you plenty of room for gracious outdoors living, whether you want to dine, entertain, or just plain relax—and you don't have to mow it.

A deck can stand alone, be built adjacent to the house, or constructed in conjunction with a pool, carport, or garage. It can be built on the ground or on stilts. The Western Pine Assn. suggests you use solid lumber for decks because it is easier to work and cooler under foot than other material after the Sun has been beating down on it for quite a while.

Placement of the deck depends upon existing landscapes, property lines, and the direction of the Sun's rays and prevailing winds.

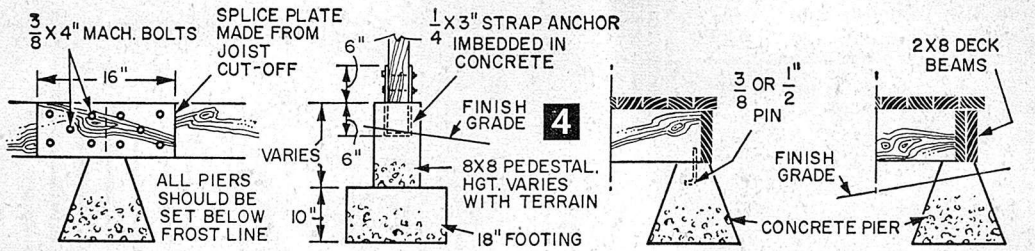
Build for Safety. The framework supporting the deck (Fig. 2) must be carefully assembled and properly fastened to make a rigid support. The deck can rest on conventional concrete piers (Fig. 4), or on pedestal-footing arrangement as in Fig. 4B. One side of the deck should be securely fastened to the house framing with a 2x6 ledger. Most communities require building permits for any type of construction. When you get yours, inquire about building code requirements.

In many respects, foundations are the most important part of any structure. If they are inadequate, the structure is unstable— which can cause it to pull away from the house and result in a sloping deck.

Depth of the piers will vary with size of deck and climate. If the deck is built over yielding soil, such as clay, the pier should be carefully proportioned to spread the load evenly over a wide enough area to avoid overloading the soil beneath.

Poured concrete piers (Fig. 4) should not be less than 10 in. square unless reinforced with laterally tied vertical rods, and should be below the frost line to prevent heaving. Extra piers may be required to support joists that are spliced as in Fig. 4A.

Supports are Anchored to the concrete piers with ¼ x 3-in. straps (Fig. 4B), bolts buried in the concrete if metal posts are used, or with an anchor pin when the joist rests on the pier as in Fig. 4C.



Wooden posts supporting the beams can be 4x4, 4x6, or 3x6. Beams can be made of 2x8s, 3x10s, 4x8s, 4x10s, and they—in turn—support the joist system (Fig. 2A). Joists are placed at right angles to the beams and are attached by toenailing, brackets, or wood wedges. Joists can be 2x6 or 2x8 planks, and spacing between them for the deck is generally 24 to 48 in., depending on the deck size and appearance. When 2x4s, 2x6s, or 2x8s are applied flat to form the deck floor, the distance between joists should be no more than 48 in.

An Attractive Variety of decking installations can be installed, such as flat or on end, in parallel lines, diagonally, in herringbone patterns, or in a parquet-like design as in Fig. 1.

For decking, use 2x4s, or 2x6s. Space supports about 4 ft. apart if 2x6s are used, or 2x4s laid on edge, or position the supports 3 ft. apart if 2x4s are laid face down. For good appearance and strength, advises the Western Pine Assn., use construction or standard grades of lumber. These are knotty boards that do the job well—and economically.

Leave a small expansion space between deck boards. This space should not be more than ¼ in. so your outdoor furniture will not splinter the deck edges. To ensure correct spacing between pieces of decking, use spacer blocks or shims of the desired thickness between boards. Besides making it easier to line up the boards, these blocks can form attractive patterns in the deck surface.

Whenever possible, use aluminum, stainless steel, or hot-dipped galvanized nails and fasteners. These will provide the longest service and greatest resistance and prevent rust stains that mar the appearance of the wood. Apply preservative before construction so all wood surfaces are treated, with special care given to ends sawed during construction.

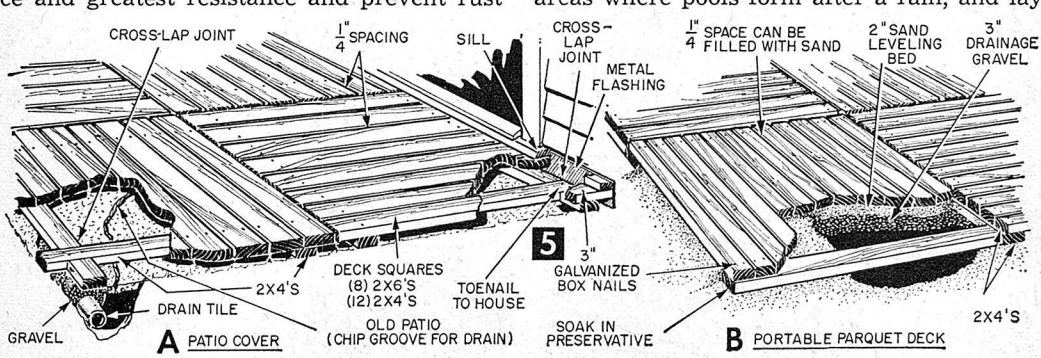
Built-In Benches (Fig. 3) can double as safety railings and provide permanent seating as well. Whether you choose to install just a railing or a built-in bench, it is important that it be attached securely to the joists or beams.

For a seat against the railing (Fig. 3A), the rail support can be a tapered 2x8 nailed to the deck beam with 2x4s between the supports and as a cap. The 2x4 seat is braced with a 2x4 and 2x6, and a 1x6 backrest nailed to the upright supports. Or, the seat can be made with 2x4s (Fig. 3B) and fastened to a 4x4 post and the deck surface. The 2x4 seat members are attached ⅛ in. apart, and bench width is 18 in. A seat that overhangs the deck (Fig. 3C) should be attached to the beams with bolts to ensure safety.

Common chicken wire can be stapled on the outside of the railing to maintain the open feeling and as a safety precaution. Long flower boxes set on bricks can also act as a railing on decks that are a few feet off the ground.

Ground Cover Decks can be used to restore a chipped or cracked masonry patio or to convert a surface near the house into an outdoor dining or play area that is glare-free and will not reflect light and heat into your home (Fig. 1).

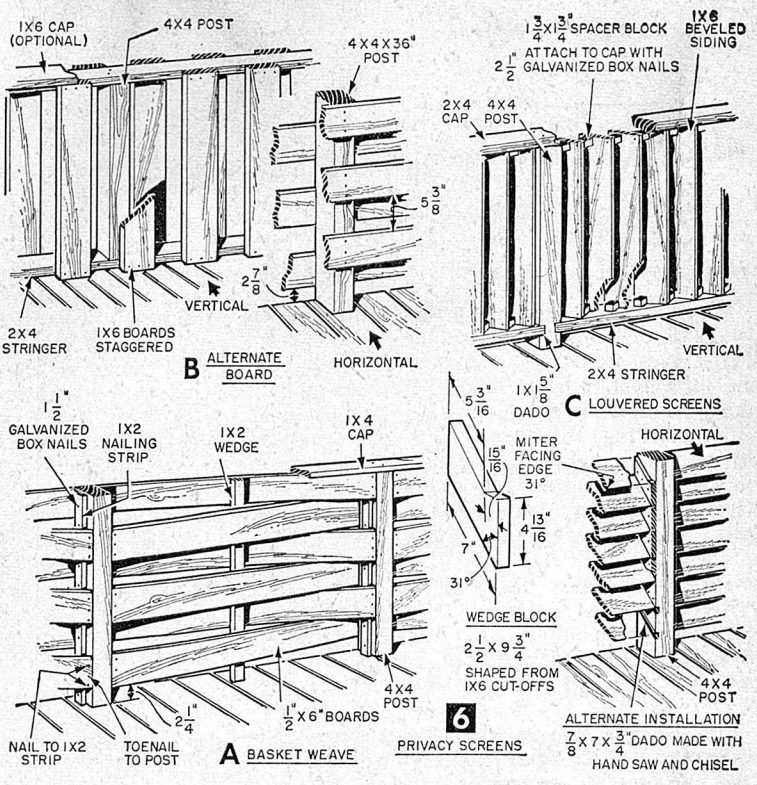
If your present masonry patio needs repairs or is getting too small, cover it with a wooden deck as in Fig. 5A. Before you start to cover it, chip run-off grooves to drain water from areas where pools form after a rain, and lay



field tile imbedded in gravel to encourage drainage.

Form a foundation grid by laying 2x4s on the concrete spaced 3 ft. on center, then toenail or cross-lap shorter lengths to the larger ones. Toenail this grid to the side of the house. Boards on top can be full length, or cut to 4-ft. lengths and positioned to create a pattern. For drainage on your new deck, plan ⅛-in. drop for each foot of width or length, whichever direction is desirable for drainage.

Extend your patio (Fig. 1) by covering the ground with parquet decking made of 2x4s. This decking can be permanently installed on foundation strips (Fig. 5A), or squares built as a unit (Fig. 5B) that can be lifted out for a planting area or moved entirely to a new location. These squares should be built to a convenient size, with the 2x4s spaced about ¼ in. apart.



Prolong the life of your ground cover deck by coating the wood with a pentachlorophenal solution such as *Woodlife,* or by building it out of pressure-treated lumber. Also, provide for proper drainage by laying the deck on an underlayment made of 3 in. of gravel or cinders that is topped with at least 2 in. of sand for the leveling bed.

Privacy Screens (Fig. 6) can serve as railings and can be made higher to give protection on the windward side of the deck. By using basketweave, alternate board, or louver designs you can get protection without totally cutting off the supply of light and air. These screens can be attached directly to the deck by nailing or bolting the post to the beams or by burying one-third of the post in the ground when you lay a ground cover deck.

Work up from the bottom when constructing the basketweave screen (Fig. 6A). Center 1x2 nailing strips on each side of the 2x4 or 4x4 posts. The ½ x 6-in. boards are alternately nailed to the front and back of the strip, with one or more fasteners toenailed into the post. After several boards are in place, wedge a 1x2 between the boards midway between the posts to force the boards to arc.

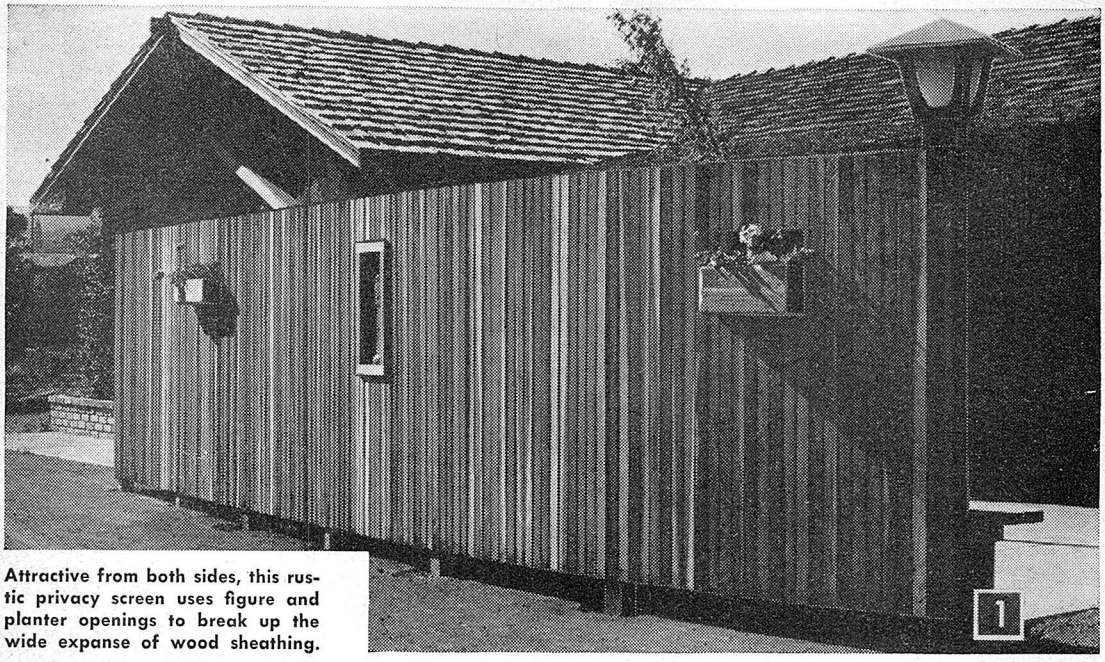
Alternate board screens can be either horizontal or vertical (Fig. 6B) and give the barrier a three-dimensional effect. Boards can be 2-, 4-, 6-, or 8-ft. widths, and are alternated from front to back. When making the vertical screen, try to space the boards so the posts are covered from the facing side. Framing can be made from either 2x4 or 4x4 posts and 2x4 stringers.

Louver slats set vertically or horizontally, or a combination of both, provide privacy and good air circulation (Fig. 6C). Louver angle is determined by placing each edge of the ½ x 6 beveled siding in the vertical screen, or 1x6 boards in the horizontal barrier flush with the stringers or posts, then inserting spacer blocks for uniform spacing of the slats.

Finishing Should Be Done with a good exterior-type pigmented house stain if you don't want the wood to take on a gray, weathered look. Stains are available in a variety of colors and are less expensive and easier to apply than paint. Stains also are less likely than paint to get hot in the Sun, and so are more comfortable to bare feet.

For a water repellent finish, brush several coats of Woodlife on clean and dry wood. It should be applied in temperatures above 40°, and end-grain should be soaked thoroughly. Succeeding coats can be brushed on before the first coat is dry, or after three or four months of weathering.

Of the ten Western Pine region wood species, Inland Red and Incense Cedar heartwoods do not require a preservative.



Attractive from both sides, this rustic privacy screen uses figure and planter openings to break up the wide expanse of wood sheathing.

GLAMOUR SCREEN

Instead of being just a barrier, a screen should turn your patio area into a private, restful, and pleasant outdoor room

By R. J. DeCRISTOFORO

A MODERN screen that appears to be a natural part of your landscape will unify house and patio, provide for your outdoor living and entertainment . . . and add to the value of your home.

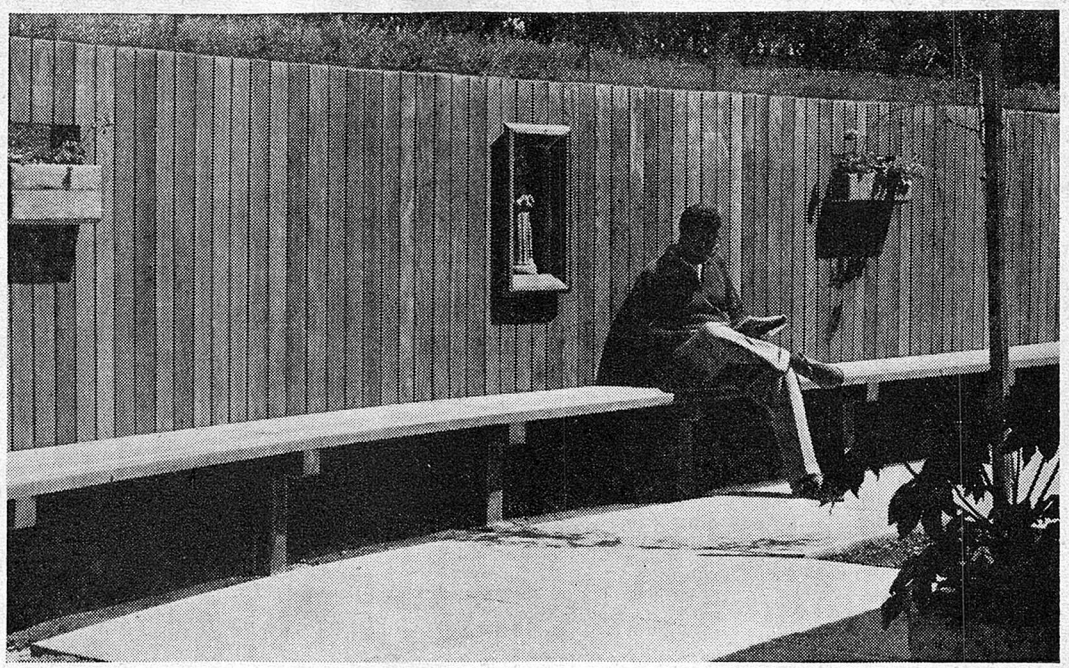
The screen in Fig. 1 has a slight curve to match the contour of the patio and give it a three-dimensional appearance. A 26-ft.-long seat was built to accommodate guests and is wide enough for sunbathing.

Redwood was used in construction (see Materials List) because of its outdoor qualities. Other materials, however, can be used. Even outdoor plywood would be appropriate, especially the new *Texture 1-11* Douglas fir plywood that is grooved and will provide the vertical shadow lines that can be seen in Fig. 1. If the wood you select is not naturally resistant to insects, rot, and decay (this applies only to those areas of the posts below grade) brush on or soak it in a preservative.

First Step is to mark the centerline of the posts on a line duplicating the contour of the patio. Best way to do this is to make a scribe by driving a nail through one end of a 1x2x 24-in. furring strip. Butt one end of the 1x2 against the patio edge, and move the marker along so the nail makes a groove in the ground to mark the post centerline.

If the patio is curved, the inside face of the posts must be parallel to the tangent of that curve (Fig. 2A), so the distance between posts will vary slightly. This doesn't apply if the screen is straight. Mark post locations on the line and dig the post holes with an auger or post hole digger at least 6 in. in diameter. Holes should be 24 in. deep for the screen posts, and 12 in. deep for the posts that support the seat.

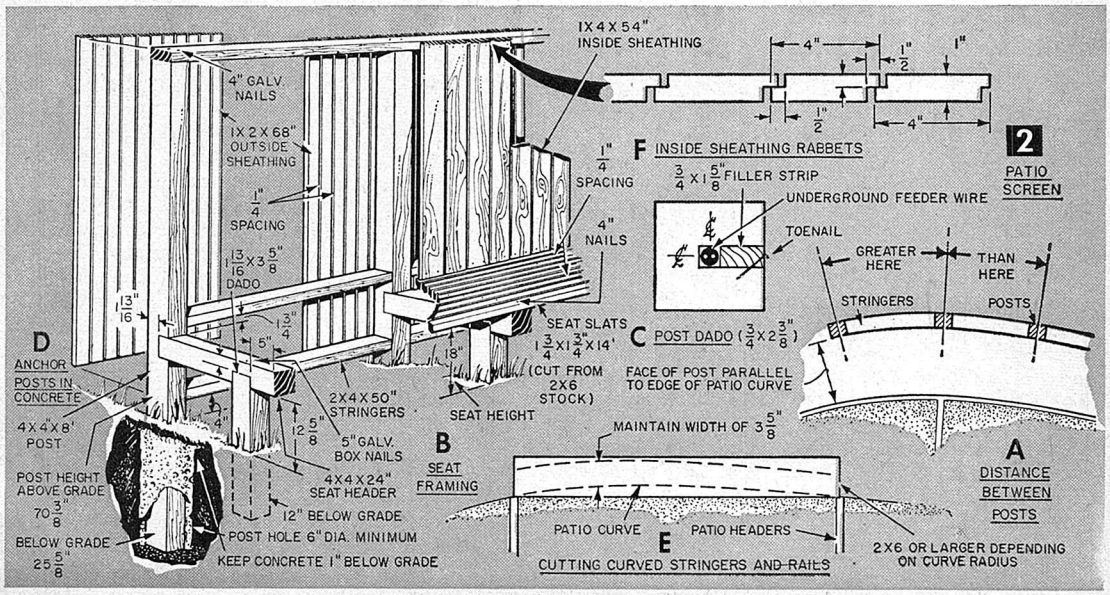
Posts in Fig. 2 were set on 4-ft. centers to match the spacing of headers in the concrete patio and were needed to provide adequate support for the 26-ft.-long seat. If you plan to build the screen without the seat, put the posts 6- to 8-ft. on center.

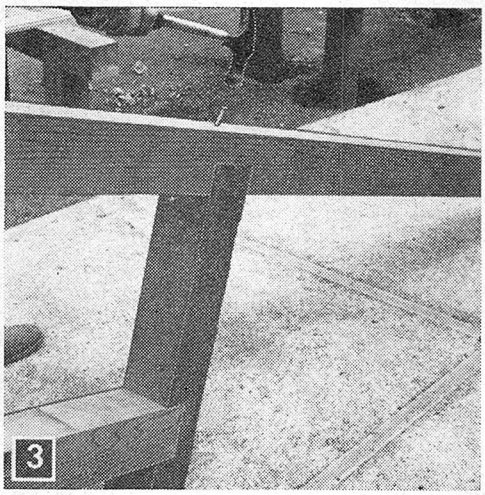


FOR YOUR PATIO

Cut Both Screen and Seat Posts (Fig. 2) to approximate length and place them in the holes. Use a carpenter's level to mark the patio level on the posts. All vertical measurements above grade will be made from these marks.

Cut the seat headers to exact length and mark the dados needed in the headers and





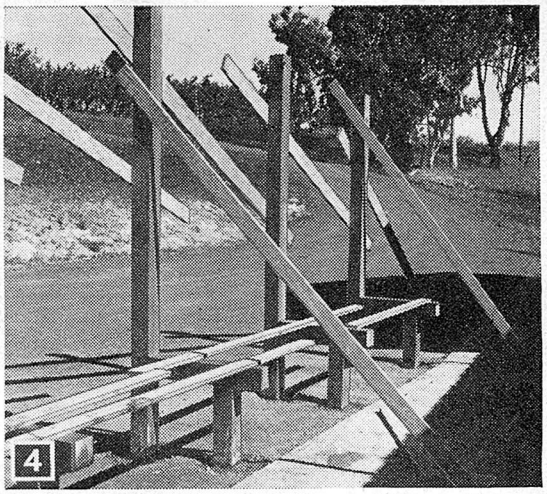
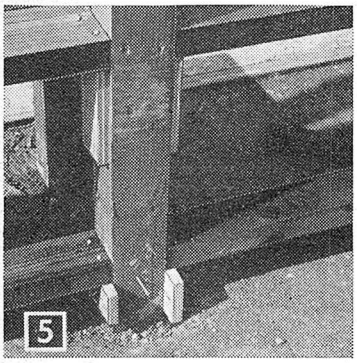


Fig. 3. Preassemble the posts and seat headers by fitting the members into the dado openings and fasten with 5-in. galvanized nails. Fig. 4. Temporary braces will keep posts and other frame member plumb until the concrete sets.



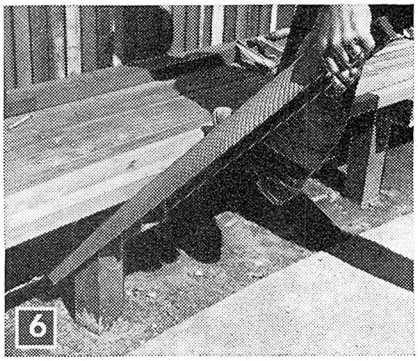
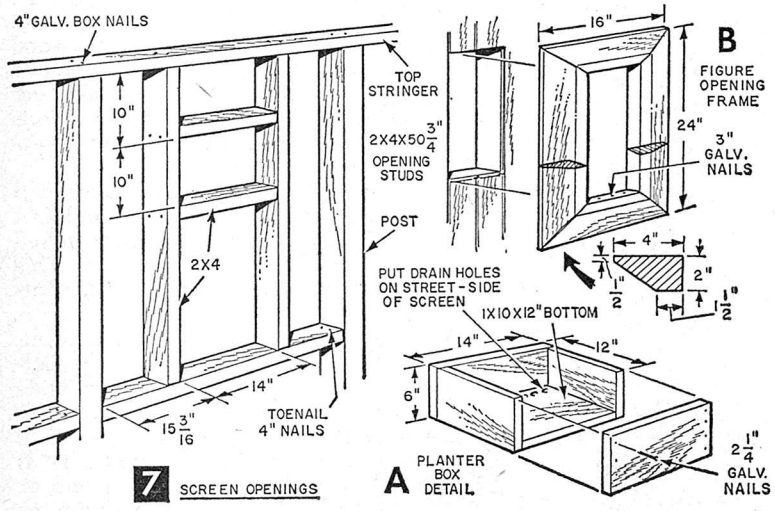


Fig. 5. Attach temporary blocks to the posts so the stringers will be level when they are toenailed. Fig. 6. Straddle the seat post with a U-shaped pry to bend the seat slats to the required curve.



7 SCREEN OPENINGS

posts (Fig. 2B). You can form these dados by making outline cuts with a hand saw, then chiseling away the waste. To make these dados on the average home workshop table saw or radial arm saw, you'll need an 8-in. dado assembly.

Make Sub-Assemblies (Fig. 3) of the posts and header combinations. If you plan to install an outdoor light at one end of the screen, you'll have to plan for the cord hole before assembling the end post. To make provisions for the cord, cut a deep dado along the length of the post, then close it partially with a filler strip (Fig. 2C). Be sure to snake this wire through before you set the post permanently in the ground, and remember the wire is in this post. Any nailing must be done off-center to avoid hitting the wire.

Have someone help you set the post assembly in the holes and attach temporary bracing (Fig. 4) to keep the framework plumb.

First set them up by eye, driving bracing nails in just enough to hold the pieces in place. Then go over each post with a carpenter's level to be sure it is perfect. Check levelness of the seat headers as well as the vertical members.

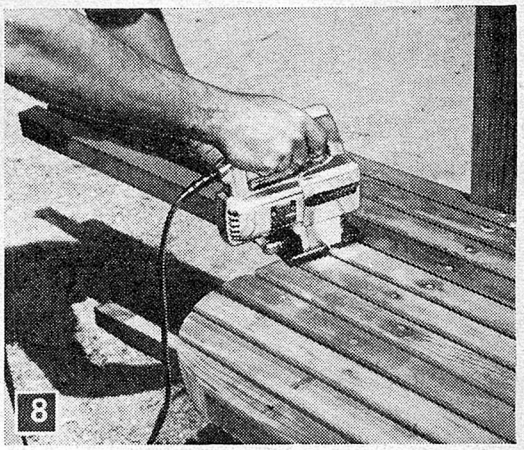
When you are sure everything is plumb mix a batch of concrete and fill the holes around the posts (Fig. 2D). Fill and tamp the concrete to about 1 in. below grade so soil can be used to hide the concrete. Since you won't need too much concrete for this job, buy it by the sack. Let the concrete set for at least 24 hours before working further. Sprinkle water on it daily so the concrete will cure properly for at least a week.

Installing the Stringers is a matter of cutting them to length so they fit snugly between the posts and toenailing them in place with 4-in. galvanized box nails. If the screen is straight, you can use by 2x4s; if not, you'll have to cut curved stringers out of 2x6s or 2x8s (Fig. 2E). Use a large piece of wrapping paper to plot the curve and transfer it to the stringer. Make the length a little oversize so you can trim to fit on assembly.

When toenailing the stringers, use temporary support blocks (Fig. 5) to hold them in place. This will help maintain alignment when you drive in the 3-in. galvanized nails.

Install the studs and headers for the screen openings (Fig. 7). These dimensions are not critical. If you want larger or smaller openings, adjust the measurements to suit your requirements. Eliminate studs and headers if no openings are wanted.

Outside Sheathing should be installed by using a level to get the first board plumb, then using a small piece of ¼-in. plywood as a spacer to install the remaining pieces. Use a chalk line to keep the bottom even, then drive 2½-in. nails into the bottom and middle stringers and top rail.



Round off the seat slats with a saber saw and use a hand saw to trim off any projection of seat headers beyond the slats.

The screen was double-sheathed with different textured materials to give a contrasting appearance from outside to inside. This adds to cost, so if the outside of your screen is not too important leave it unsheathed.

I found it cheaper to buy 2 x 6 construction grade redwood and cut it to 1¾-in.-square stock for the seat slats. This size will bend to fit a moderate curve. Make a U-shaped jig to straddle the seat posts (Fig. 6) to bend the slats. Drill a 3/16-in. pilot hole through the slats to prevent the wood from splitting when you drive in the 4-in. nails. To get a uniform appearance, use a ¼-in. plywood spacer between the slats. A saber saw (Fig. 8) will do a good job of rounding off the seat ends.

Inside sheathing was bought as rough 1 x 4s in 14-ft. lengths, then run over a 6-in. jointer to get a finished faceside. After the boards are cut to length, cut ½-in. rabbets (Fig. 2F) and edge-mount the sheathing. Use the plywood spacer when installing the sheathing to leave enough room for the wood to contract and expand with changing climatic conditions and to give the surface a solid face with vertical shadow lines.

Final Touches are the planter boxes and figure opening molding (Figs. 7A and B). Exterior surfaces of the boxes were roughed up with a *Stanley Rotary Surform* tool. This provided a rustic texture that looks outdoorsy and blends with the screen.

Position the planters in the screen openings, then drill drain holes through the bottom to direct excess water on the outside part of the screen. This way, the water won't drain down on the seat.

If you want the screen to look rustic, let it weather a while before brushing on one or two coats of sealer. Or, you can stain or paint it.

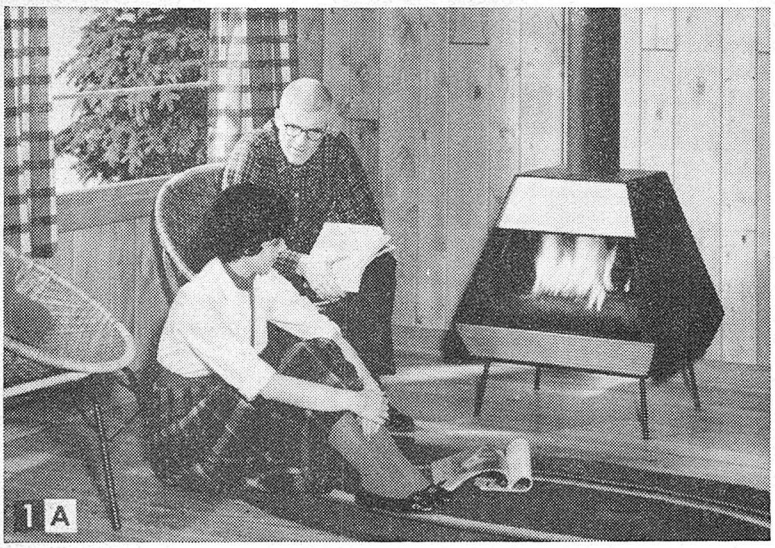
MATERIALS LIST—PATIO SCREEN

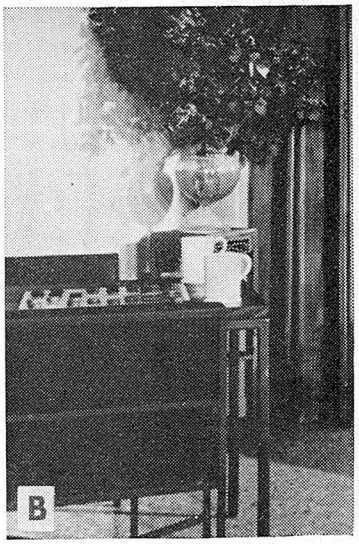
No. Req.	Size and Description	Use
	LUMBER	
	Parentheses indicate nominal sizes used when ordering lumber.	
135	(1x2) x 6′ redwood	outside sheathing
80	(1x4) x 6′ redwood	inside sheathing
1	(1x6) x 8′ redwood	planter sides
1	(1x10) x 24″ redwood	planter bottom
22	1¾ x 1¾″ x 14′ redwood	seat slats
1	(2x4) x 4′ redwood	ends, sides
9	(2x4) x 10′ redwood	stringers, studs, headers
2	(2x4) x 14′ redwood	top rails
7	(4x4) x 8′ redwood	posts
1	(4x4) x 9′ redwood	seat posts, headers
2	(4x4) x 10′ redwood	seat posts, headers
	FASTENERS	
½ lb.	2¼″ galv. common nails	planters
5 lbs.	2½″ galv. common nails	sheathing
2 lbs.	3″ galv. common nails	toenail stringers to posts
1 lb.	3¼″ galv. common nails	studs, headers
3 lbs.	4″ galv. common nails	stringers, figure frame, seat slats
3 lbs.	5″ galv. common nails	seat headers

Packaged Fireplaces

Manufactured free-standing and stationary units are quickly assembled without the time and expense of heavy masonry

By TONY MASTEY





Quick installation cuts construction costs and provides a fireplace suited to contemporary or traditional decor.

A MANUFACTURED fireplace can be erected in about 10 hours to bring the charm and comfort of a wood burning fireplace into any room in your house, without the high cost of conventional masonry construction.

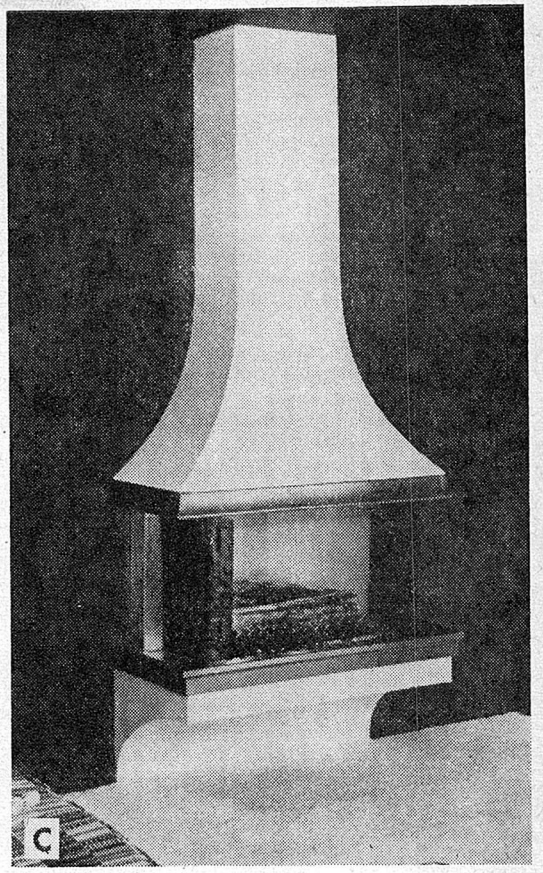
Modern styling and a variety of models make it possible to select a fireplace that can be in the family room, kitchen, den, bedroom, enclosed patio, and cabin. There are free-standing units (Fig. 1A and B) that can even be moved to various locations in the room—as long as you provide several chimney outlets; and there are stationary types (Fig. 1C), that can be put against a wall as in Fig. 7 without making a special foundation for it.

The only tools required for the installation are a hammer, screwdriver, key hole saw, hack saw, tin snips, carpenter's level, and a ¼-in. drill. A few masonry tools will be needed if you install the fireplace in your basement and run the chimney through the foundation wall as in Fig. 5.

To Assure Efficient Operation of the free-standing unit, the fireplace should be located as close to the chimney as is practical. Make the smokepipe connection to the chimney flue short and direct, using as few elbows as possible. Choose a location convenient to a window, or a position where the chimney can run through the interior of the house or an outside wall (Fig. 2). If the fireplace flue is to run through the interior of the house, you might consider locating it where it is possible to box in the chimney or run it through an interior closet. A space approximately 19 in. square is required to do this.

Be sure to connect the fireplace to a chimney flue not serving any other major appliance whenever possible. If the fireplace is connected to a flue serving other appliances, which may be operated while the fireplace is also in use, the flue must be of adequate capacity to handle the products of combustion of both appliances. By overloading the flue, there is a possibility that one appliance may interfere with the draft for the other and consequently result in a smoking problem.

Most Building Codes Require that the back and sides of the free-standing fireplace be kept a certain distance from combustible materials, unless, as in the case of the Heatilator Model 5900 (Fig. 7), it has a high temperature insulation barrier built into it. The free-standing units in Fig. 1, made by Vega

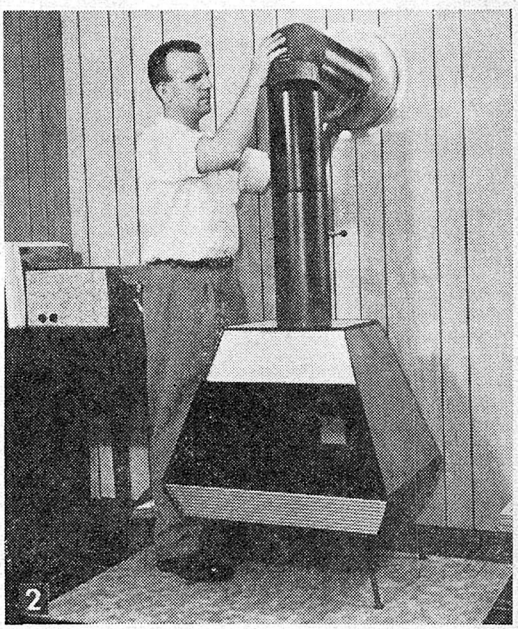


Industries of Syracuse, N. Y., are set 18 in. away from the wall.

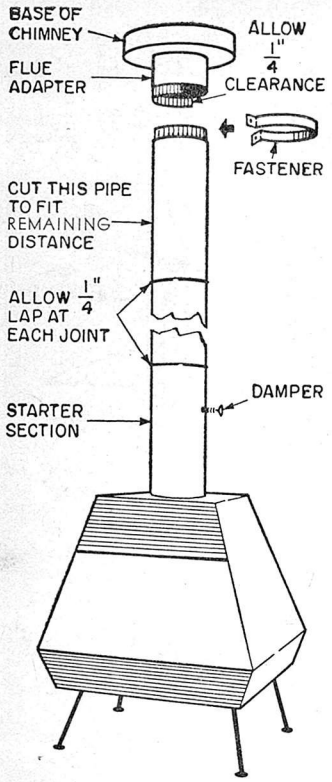
It's recommended that the floor under the fireplace, 8 in. on each side, and 16 in. in front of the firebox opening be made of, or protected with non-combustible material such as ceramic tile (Fig. 2), asbestos tile, brick, or concrete.

For best operation, the smokepipe should not run horizontally for a distance exceeding one-half the vertical height of the chimney serving the fireplace. Do not connect the fireplace to a vent that is designed for use only with a gas-fired furnace or appliance such as a water heater. If the location you choose does not have an existing flue to serve the fireplace, a specially designed insulated chimney should be installed (Fig. 5). This chimney has an outer casing around the smoke pipe that gives safe insulation protection when it is run through a partition, ceiling, or roof.

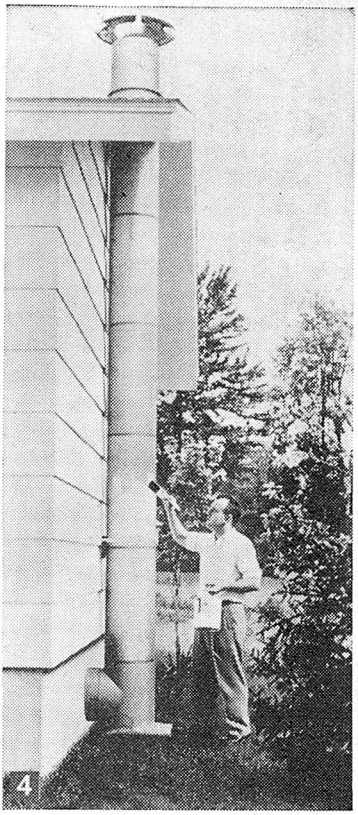
After You Assemble the Fireplace by following manufacturer's instructions, position it where you intend to make the complete installation. First step is to install a 2-ft. length of smokepipe with a damper on top of the fireplace, and seat it firmly. Press together the other sections of the smoke pipe until you are near the ceiling.



Free-standing fireplace has a 7-in. smokepipe that leads to an exterior chimney which is shielded to prevent combustion. Ceramic tile hearth prevents fire hazard caused by sparks when adding wood.



3 FREE-STANDING UNIT



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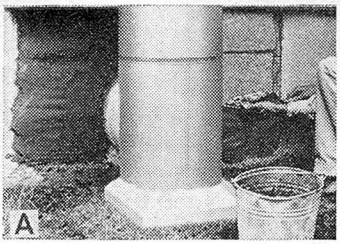
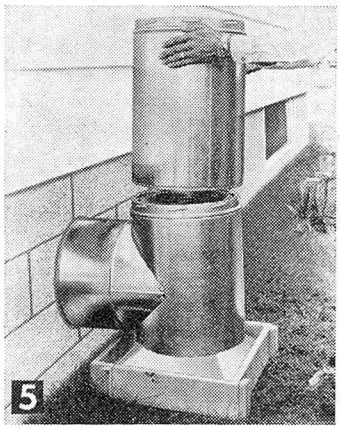


A

Chimney can be painted with enamel or latex paint to match color of house.



5

Built-up pad under "T" helps support weight of chimney from ground level to roof height.

At this time, measure the distance from the center of the smokepipe to the back wall and from another wall so you can determine the relative position of the fireplace in the room. Use these dimensions once you are in the attic to drill a guide hole between the rafters so that the chimney is accurately centered.

When you're back in the room, drill a starter hole and use a key hole or saber saw to cut through the ceiling. The chimney starter section is designed so that it can be fastened to standard 16-in. rafters or joists by means of common nails or wood screws.

Extend the chimney through the roof so that it protrudes by at least 3 ft. when it is located more than 10 ft. from the peak, or 2 ft. above the peak of the roof.

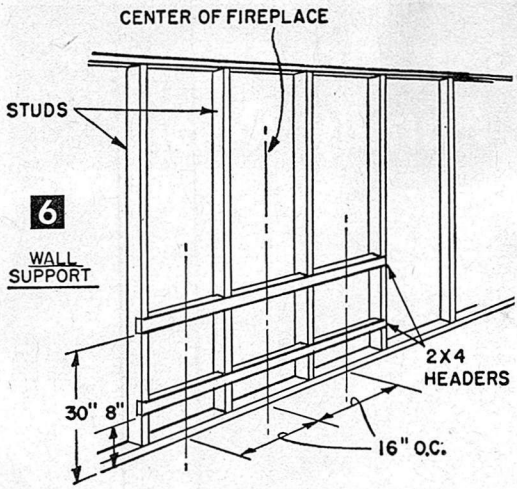
After the Chimney Is Installed, carefully check to be sure that the flue collar of the fireplace is aligned with the chimney flue, and that the smokepipe is vertical. Cut the last section so that the end of the smokepipe will clear the upper part of the notch in the flue adapter by about ¼ in. (Fig. 3). Rock the pipe forward and install the cut section. Push the pipe into the adapter and securely fasten the front cover strip to hold it in place.

When the smokepipe goes through an outside wall (Fig. 2), the horizontal pipe should be pitched at least ¼ in. for every foot of flue used between the fireplace and the elbow. This way you can be assured that the smoke will flow upward and not become trapped in the outlet and cause a smoke problem.

Erecting the Chimney. A concrete base pad (Fig. 5) can be laid and a "T" section embedded in it when the chimney comes through the foundation wall in a basement installation, and has to travel a long way to get through the eave and above the roof (Fig. 4). The 8x18x18-in. pad in Fig. 5 was made so that 4 in. of mortar is below the ground surface, and it is close enough to the house so it won't be disturbed by the frost. After the cement is poured, embed the "T" section in it and allow the mixture to set. Use excess mortar to seal the opening where the pipe passes through the foundation.

Set the chimney up in sections from the pad to the eave. Use a key hole saw to make the 15-in. opening in the eave, and continue with the chimney until it reaches the required height. As the chimney is installed along the wall, hold it in place with metal straps that are placed around each section and screw-fasten to the wall. Fill the opening between the eave and chimney with roofing tar.

A conventional sheet metal chimney cannot be used because it does not have the insulating qualities necessary to provide for a



zero clearance to combustible materials. Special prefabricated chimney sections, such as *Metalbestos* assembly in Fig. 5, have an inner flue and an external flue shield. Insulation material air space built into the sections provide heat barriers that are necessary when installing the chimney near combustible material.

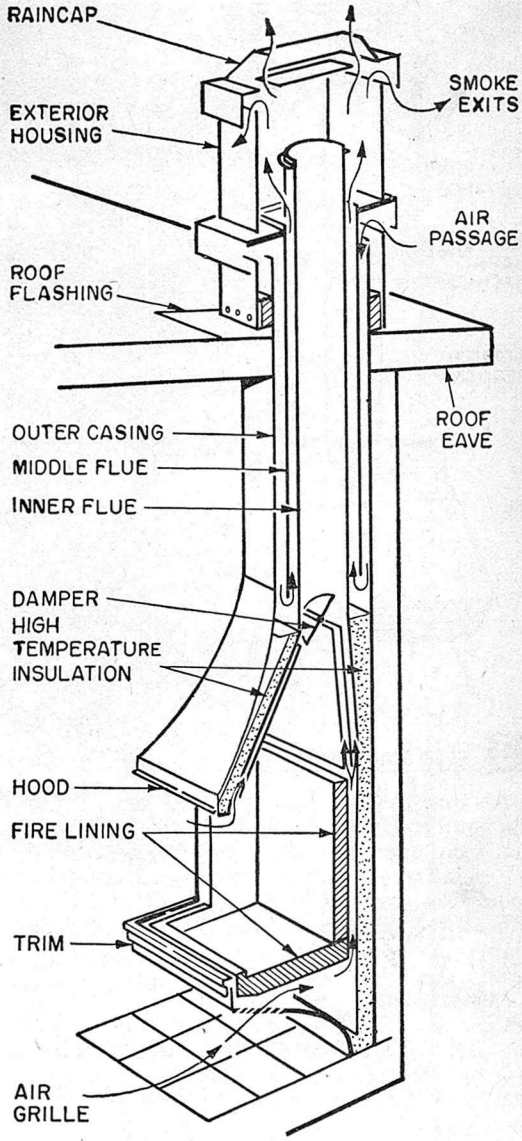
The Permanent Fireplace (Fig. 7) can be installed against a finished wall surface, or it can be recessed into the wall not to exceed 3 in., provided that any header or plate which is cut into is adequately reinforced. The chimney must rise vertically with no bends or offsets.

This fireplace is designed to fasten to studs located on 16-in. centers. When installed against a finished wall, fasten to the studs with ¼ x 2-in. lag screws, not just to the wall surface. If the studs are not on 16-in. centers or if the desired location is such that holes do not line up with the studs, mark the center line of the desired location on the floor near the wall, and mark the wall as in Fig. 6 so you can install the headers.

Assemble the fireplace according to manufacturer's instructions and make a 14½-in. square opening in the ceiling with your key hole saw directly above the hood. Box in the opening to hold the flue in proper position against the wall.

All joints in the chimney sections should be tight and smooth. After setting each section in place, tap each corner with a wooden block to close any gaps and to align the moldings. This ensures tight joints at all corners.

For most chimney installations the middle and inner flues should extend no higher than the peak of the roof and not less than 7 in. below it. Occasionally, when the chimney exit point is less than 12 in. measured vertically from the peak, the flues must extend 7 in. above the roof at point of exit. If necessary, cut off the excess. Toenail a box of 2x4s on



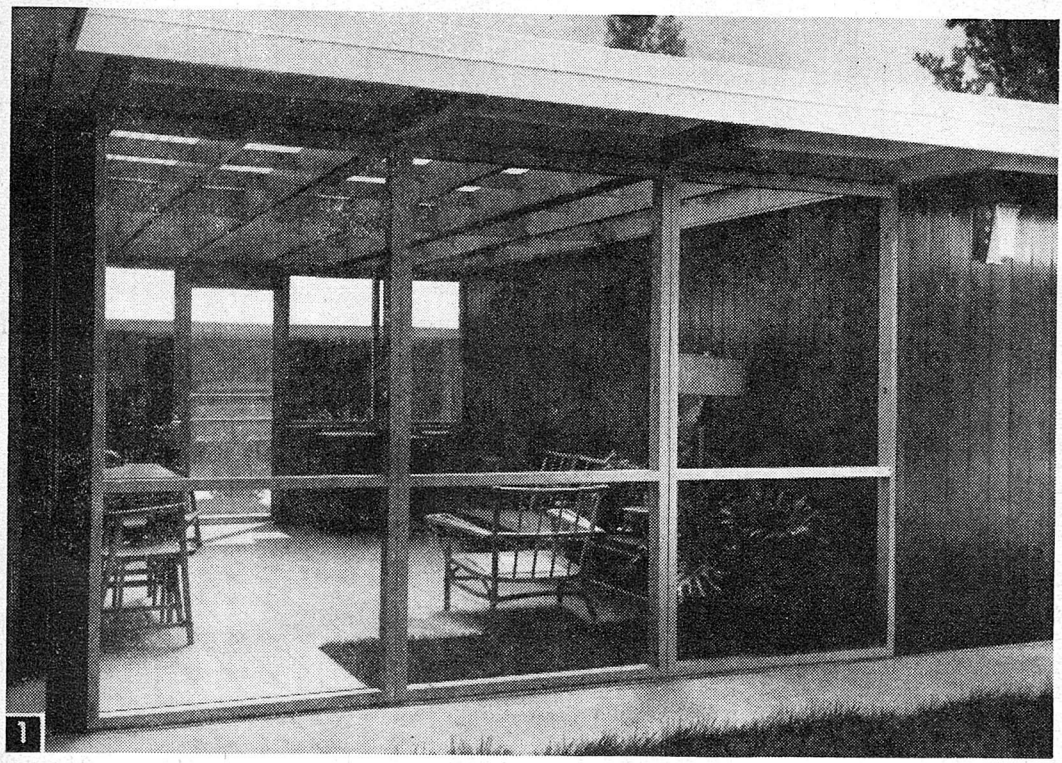
7 PERMANENT INSTALLATION

edge around the opening in the roof, and flash around this box.

Cut the lower part of the chimney housing to the pitch of the roof and to the proper height. The top of the housing should be at least 12-in. above the point where the housing comes through the roof. Set the housing over the 2x4 roof box, plumb and nail securely to the box. Apply calking where the housing meets the roofing.

These packaged fireplaces are available in many enamel finish colors to suit your room decor. Some models can be painted with either a flat or enamel paint when you change your color scheme. Many of the units come already primed from the factory.

Screen Your Patio or Breezeway for an Outdoor Family Room



Breezeway enclosed with modular screen panels makes outdoor living a real pleasure for the whole family. Wide lattice gives panels a flush appearance.

Greet the hot weather ahead with wide modular panels you can build now for $60 to $90

By DAVID M. SWARTWOUT

WHEN summer rolls around this year, your family can enjoy a comfortable, mosquito-free outdoor living room for $60 worth of materials if your home now sports a breezeway as in Fig. 1. And you can install the same hot weather luxury in a covered porch or patio as large as 12 x 16 ft. (Fig. 10) for around $90, thanks to modular screen panels of simplified, yet sturdy construction.

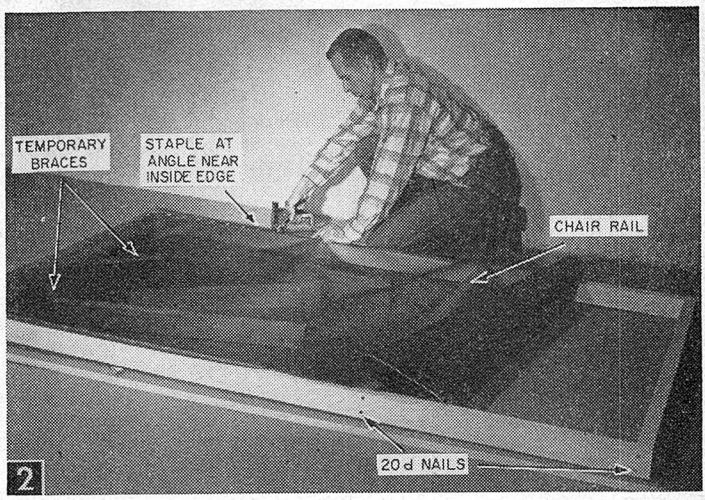
You can assemble the large panels now in your basement or garage to have them ready for quick installation when the first warm days arrive. The 4 x 7-ft. screen panel will average about $7.50 for materials; a privacy panel, substituting hardboard for most of the screening, about $9 and a door panel, complete with screen door and hardware, about $20. Six panels will do the job for most breezeways; nine or ten most patio porch areas. You can lop off $1 per panel if you use galvanized instead of *Fiberglas* or aluminum screening, but maintenance cost will be higher.

If your patio is roofless, you can erect a top customed-designed to fit the panels. Even if you have no patio at all, there's still time to do the whole job before much summer heat beats down upon us.

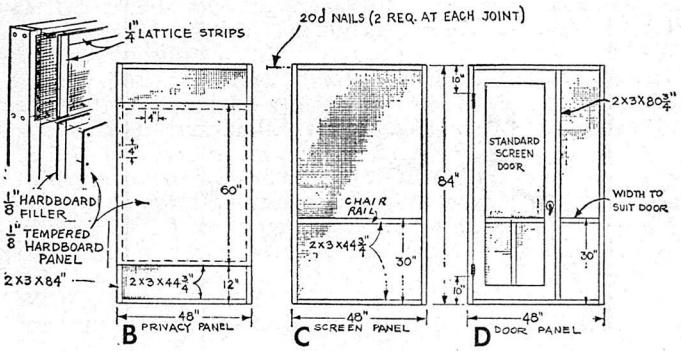
Plan Your Area First by laying out a scale plan on graph paper as in Fig. 3A. Divide the

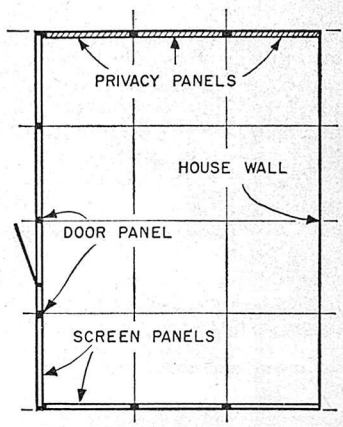
perimeter into 4-ft. modules or a size to fit your area. Locate door position and indicate which panels are to be open and those to be closed for privacy or protection from wind and weather. Now you can work out the number of panels required and estimate the lumber needed from the Materials List.

If you have an existing porch or breezeway to be screened, modify the 7-ft. panel height as necessary to complete the enclosure. If possible, hand pick the standard 2 x 3-ft. lumber (actual dressed size 1⅝ x 2⅝ in.) that is relatively free of twists and crowns. Your dealer will precut it to lengths you specify if you desire.

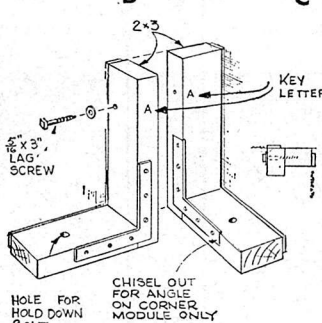


Screening is attached with ½-in.-long staples across the top, then down the sides. Wire is pulled taut as work progresses but not tight enough to form scallops along edges. Scrap framing pieces underneath help hold up wire in center of span.

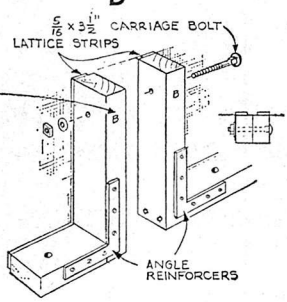




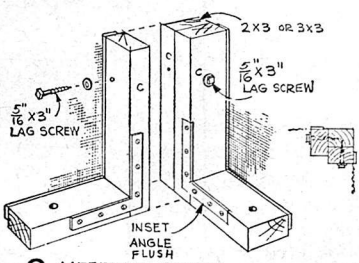
3 A TYPICAL PATIO PLAN FOR 12 X 16' AREA (4'SQS)



E CORNER DETAIL



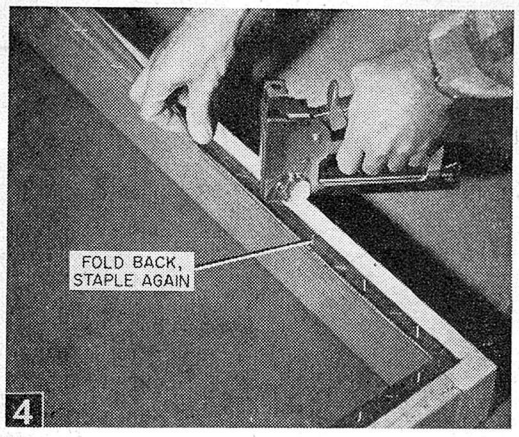
F PANEL JOINT DETAIL



G ALTERNATE CORNER

Building Panel Frames. As you build each modular unit, arrange the long side pieces so that any slight crown existing will always be on the outside. Begin by nailing two long sides to two end members with 20*d* rosin-coated nails as in Figs. 2 and 3C. To reduce the likelihood of splitting, it's a good idea to drill lead holes for the nails.

In the screen panels, next nail the chair rail crosspiece in place as in Fig. 3C. Check frame for squareness by measuring diagonally from corner to corner and adjusting unit until measurements are equal. Nail temporary braces diagonally at inside top of the unit as in Fig. 2. Screw fasten 1 x 6-in. flat corner angles in place at each corner joint as in Fig. 3E and F.



After glue dries on first line of staples, screening is folded back and a second line of staples added between original fastenings.

A standard screen door will fit in the 4 x 7-ft. modular panel with a slight change in framing as in Fig. 3D (See Materials List) and addition of two more flat corner angles.

Each privacy panel (Fig. 3B) requires two crosspieces and should be diagonally braced until after it has been screened and the ⅛-in. tempered hardboard attached. No flat corner angles are needed since the hardboard gives the panels enough rigidity.

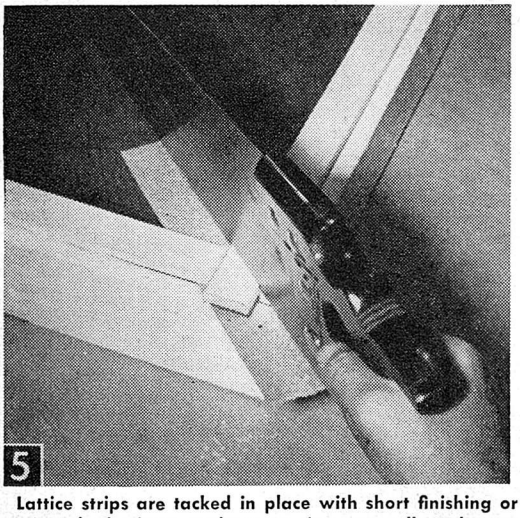
The completed frames are now ready for painting. Start with a good outside undercoat, followed by one or two finish coats of an exterior non-chalking paint in the color you desire. It is a good idea to prepaint the lattice strips now, but save the cutting for later. Where they will differ in color, such as dark framing with white trim, use 1⅛-in. wide lattice. For a flush look use 1¾-in. wide lattice and rip it to 1⅝-in. to match actual width of the 2 x 3s.

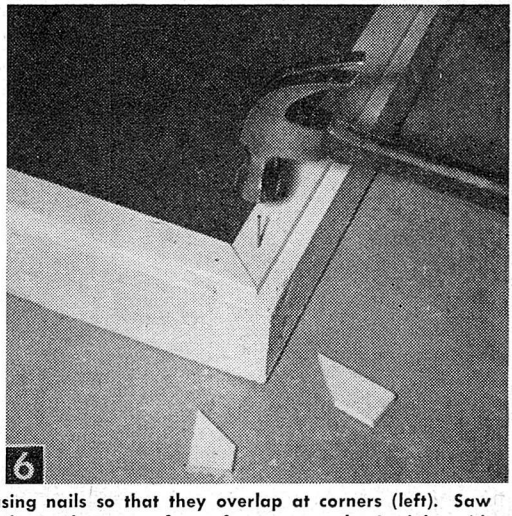
Applying Screening. After the paint dries, roll 48-in. wide screening over a frame and cut length to overlap inside edges of the frame at least 1 in. on top and bottom. Starting across the top member, then along the sides, staple screening every 3 in. as in Fig. 2. Align the same screen thread along the frame edge to insure a neat square job. A stapling gun is best for this job and can usually be rented from your local hardware or building supply dealer. Several short 2 x 3's placed inside the frame (Fig. 2) will help hold the screen up while stapling. Run a bead of water-resistant glue along the screen edges covering the staples and allow it to dry. This will add little fingers to grip the screening in each opening which will help prevent pulling out between the staples. Turn edges of the screening and staple again through both thicknesses, as in Fig. 4.

Attach the lattice strips (Figs. 5 and 6) with 4*d* or smaller aluminum or galvanized nails. You will need but little lattice on the privacy panel units since the hardboard will cover a large portion of the side members as well as the two inner crosspieces. With the screening complete, add the tempered hardboard or exterior plywood, nailing it in place as in Fig. 3B with aluminum or galvanized nails.

Stand the panels up in your basement or garage and clamp together two at a time to drill for bolts and lag screws. Key each two joining panels to simplify the final assembly as in Fig. 3E and F.

Note that in the simple corner (Fig. 3E) one panel is simply lag-screwed to the other. For a sturdier corner, you can install an additional 2 x 3 or 3 x 3 member 7 ft. long and

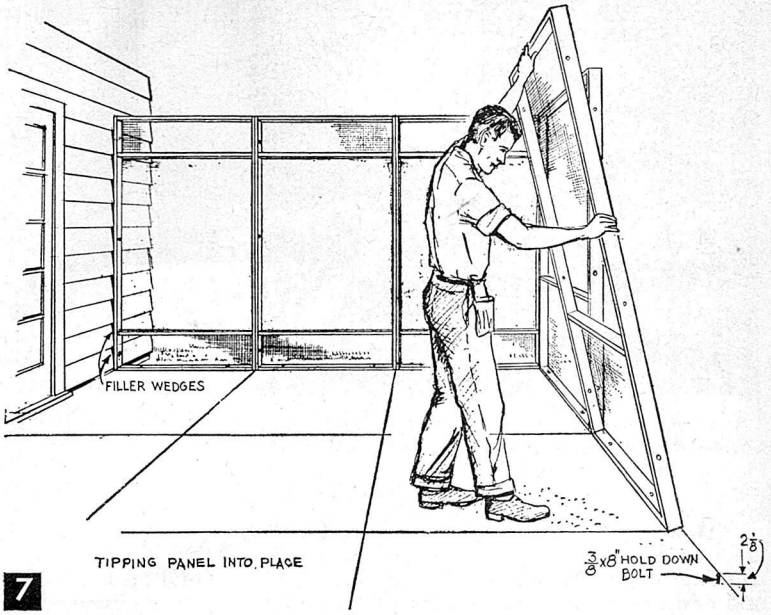




Lattice strips are tacked in place with short finishing or casing nails so that they overlap at corners (left). Saw miters both pieces at the same time as cardboard scrap underneath protects frame from saw teeth. At right, with cut completed and cardboard removed, remainder of strips are attached.

fasten both units to it with lag screws as in Fig. 3G.

If screening an existing porch or patio area, be sure to check the slope of the slab with a carpenter's level, then make tapered strips to level up the bottom of the modular screen panels. A carbide-tipped masonry bit in a low-speed (800 *rpm*) portable electric drill will make short work of drilling the holes in masonry. Lag-screw through the wood members into lead sleeves inserted in the drilled holes for hold-down fastenings. Plan two hold-down screws for each panel as in Fig. 7. On wooden decks or porches use #12 x 3-in. wood screws through the bottom frame members.



7

MATERIALS LIST—MODULAR SCREEN PANELS

No. Req. per Panel			Size and Description
Screen	Door	Privacy	
2	2	2	2 x 3" x 7' side framing members
3	2	4	2 x 3 x 44¾" crosspiece framing members
	1		2 x 3 x 80¾" vertical framing member
	1		2 x 3 x 24" (crosspiece cut to suit door)
	1		32 x 84" screen door and hardware
26 ft.	20 ft. (Max.)	12	¼ x 1¼" lattice strip
	1		⅛" x 4 x 6' tempered hardboard (privacy panel and filler strips) or ¼" x 4 x 5' A-B grade exterior plywood (privacy panel)
4	6		1 x 6 x 6 flat corner angles (bracing)
84 in.	84 in. narrow width acc. to door	26	48-wide *Fiberglas* screening
		Misc.	20*d* nails, 5/16 x 3" carriage bolts with washers and nuts, 5/16 x 3" lag screws with washers, ⅜ x 8" hold-down bolts with washers and nuts, #10 x 1½" wood screws for flat corner angles, lead sleeves for 5/16"-dia. lag screws, water-resistant glue, paint.

Patio Floor. If you're starting from scratch, accurately lay out the area to be covered by your patio. To make sure your rectangle is square at corners, use the 3-4-5 triangle principle. Measure 3 ft. along one side, 4 ft. along another. The angling side or hypotenuse should measure 5 ft. Multiples such as 6-8-10 may be even more accurate. As a check, measure the diagonals of the completed rectangle as in Fig. 8A. If they are equal, the rectangle will be square.

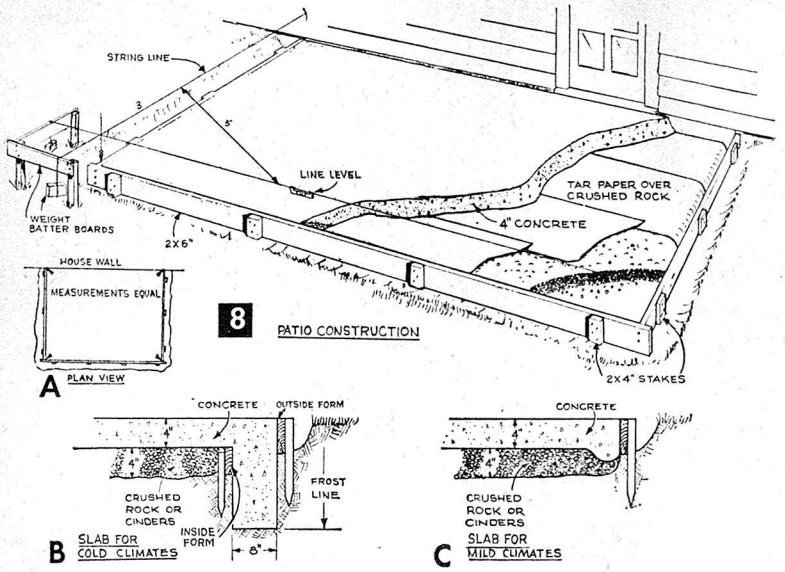
Use string lines to help establish the corners. Once they are set, build batter boards around the outer corners (Fig. 8) and hang string lines across alignment marks with weights to keep lines taut. With string lines in place, you can dig the footing and build forms without losing the corner locations. Batter board can be leveled with a string line and line level.

Set the concrete slab a step below the house floor, or on the same level if the house is also built on a slab. Where winter freezes are only moderate, you can build a floating slab with only a thickened outer edge as in Fig. 8C. Where ground freezes solid, a footing extending below the frost line along exposed edges (Fig. 8B) will keep the slab from cracking. Measure depth of trench from the taut string line.

This footing can be poured at the same time as the slab surface. Dig the trench 8 in. wide and erect forms around the top edge only, both inside and outside. The inside forms hold the material in place and are covered with concrete. For the thick-edge slab, lay out the patio area and set up 2 x 6 forms (Fig. 8).

Dig out the slab area 8 in. below the surface, then add a 4-in. layer of crushed rock or coarse gravel and tamp it well. Cover this loose fill with tar paper or a plastic film to keep moisture in concrete from soaking into the ground. If your house siding is wood, staple a double layer of tar paper along the bottom or flash this area with sheet copper. Otherwise, moisture from the concrete will rot the siding in a few years.

You can save yourself a lot of work, using



down to the outer patio wall.

If the siding is brick, install a ledger with lead sleeves and lag screws as in Fig. 9A. For a roof beginning at a boxed cave remove the fascia board to nail rafters on ends of the house rafters (Fig. 9B). If your roof will end on the house roof (Fig. 9C), remove necessary shingles and nail longer rafters through the roof into the house rafters. Cut the first rafter to find length and slope of the ends by trial and error, then cut other rafters to match. When extending a flat roof beyond an overhanging roof, run rafters to the side wall and add a filler (Fig. 9D).

ready-mixed concrete delivered directly to your forms, which costs no more than mixing it yourself. Wet down forms well before pouring so they will not absorb water from the concrete. For a stronger, less-likely-to-crack patio floor, stop the pour at the halfway point long enough to lay down some reinforcing wire mesh or reinforcing bars (available at building supply houses).

After finishing the pour, strike off concrete level with the top of the forms, using a straight-edged 2 x 4. Follow with a wood float for a rough surface or steel trowel for smooth. Now install ⅜ x 8-in. bolts along the slab edges with threads protruding about 2⅛ in. above the surface as in Fig. 7; two for each screen panel.

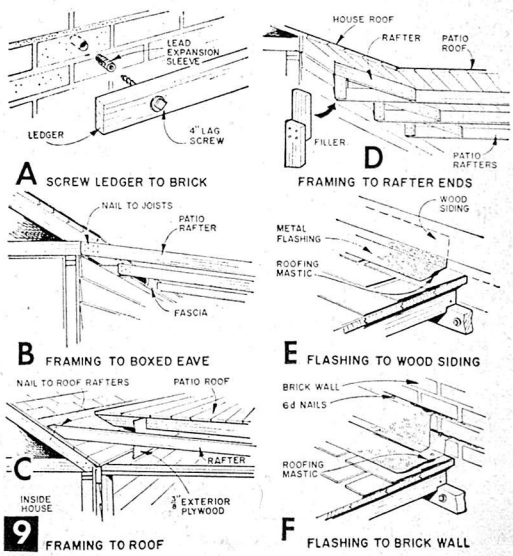
You'll have harder concrete if you don't let the sun dry it too fast. As soon as top is hard enough, cover it with a tarpaulin, or use burlap, canvas or kraft paper. Leave forms in about 10 days, or until concrete is hard.

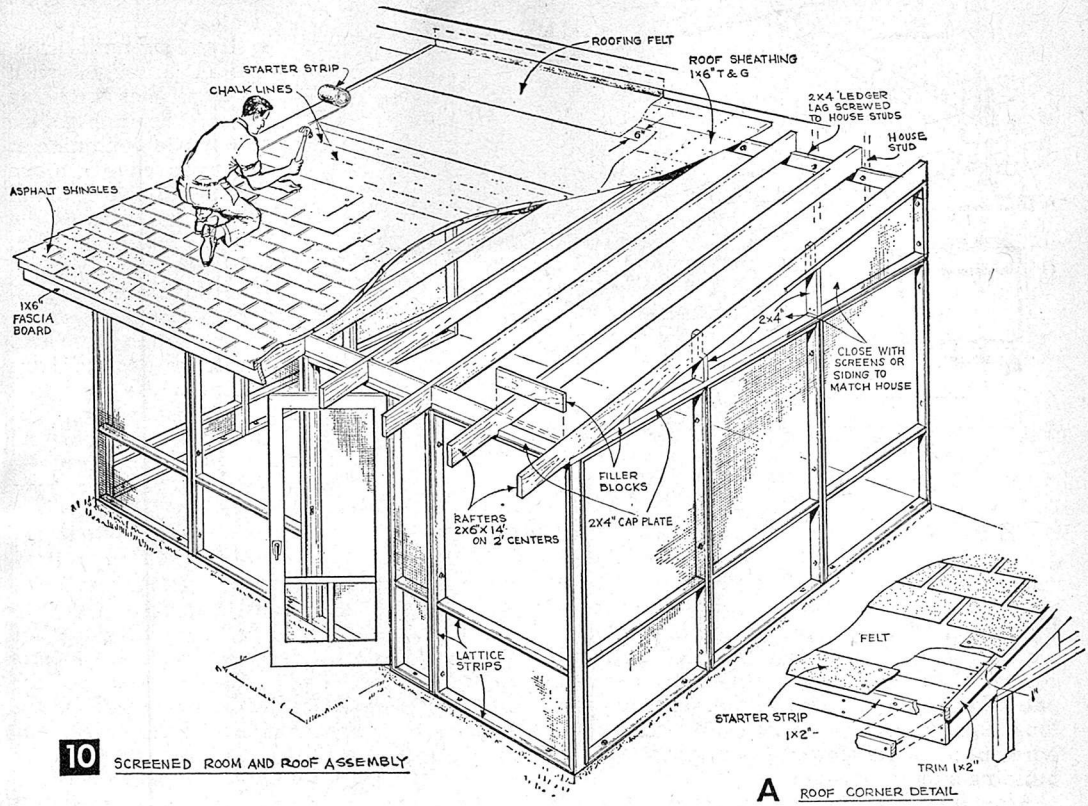
Panel Installation. Set up the first panel against the house making certain it is vertical. Locate and drill holes for the hold-down bolts, then lag-screw the panel to the house. If the wall is masonry, use a masonry bit to drill holes for lead sleeves as in Fig. 9A. When fastening to beveled siding, plan to fill in the small gaps later with wedge pieces as in Fig. 7. Continue around edge of the patio fitting on hold-down bolts and bolting panels together. When erecting the door panel be careful not to force it out of square.

Roof Framing. When all panels are up, turn your attention to the patio roof framing. If it will begin along a frame wall, secure a 2 x 4 ledger to the outside of the house as in Fig. 10. Use 5/16 x 4-in. lag screws to reach the wall studs. Rafters rest on ledger and slope

Cut 2 x 6 rafters to fit the roofing method selected. Nail a 2 x 4 cap plate along tops of the screen panels as in Fig. 10, then hold the first rafter in place against the side of the framing to mark notches for the ledger and outer wall cap plate. Cut notches, then use this rafter as a template to mark and cut other rafters. Toenail rafters on 24-in. centers on ledger and at outer wall. Notch out short 2 x 4's to fit vertically at 4-ft. intervals along half gable ends. Add filler blocks from 1 x 6-in. stock between rafters over the outer wall.

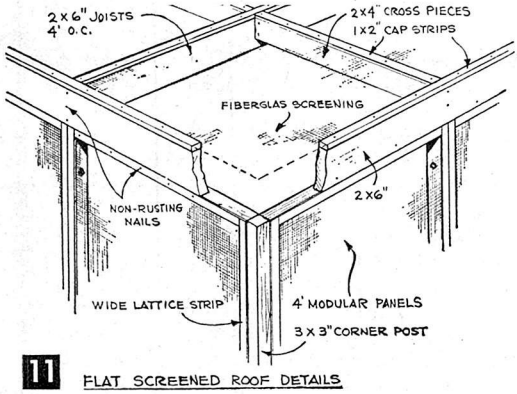
To complete the roof framing, add a 1 x 6 fascia across rafter ends, then start at the bottom and apply 1 x 6 tongue and groove sheathing over the rafters with 6*d* nails. Finally,





10 SCREENED ROOM AND ROOF ASSEMBLY

A ROOF CORNER DETAIL



11 FLAT SCREENED ROOF DETAILS

cover edges of sheathing with 1 x 2 trim, butted at corners (Fig. 10A).

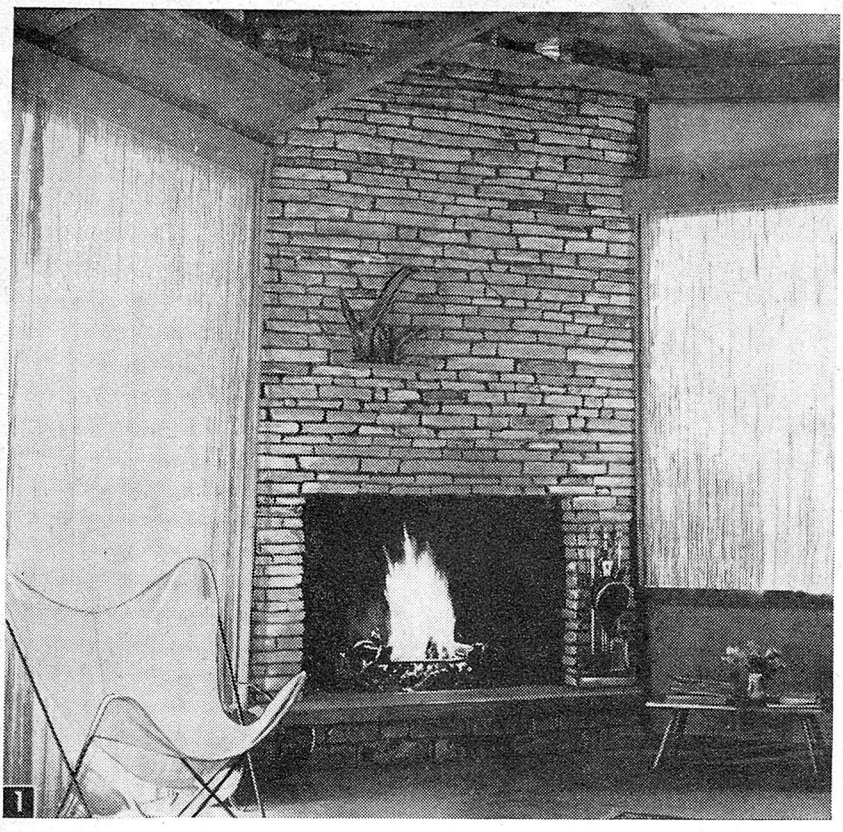
Roofing for a low sloping roof should include an underlayment of roofing felt followed by asphalt tab shingles or roll roofing. Before laying shingles, apply a starter strip (Fig. 10) around edges. Then nail tab shingles in place, six 1-in. shingle nails to each 3-tab shingle. Drive nails on each side and above notches between tabs and at ends.

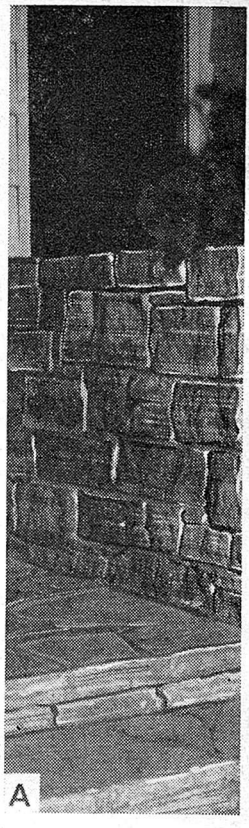
Sealing Roof Joints. Use metal flashing set in mastic compound for weatherproofing the joints. The simplest joint to seal is that between patio roof and wood siding as in Fig. 9E. Remove nails or drive them through the siding with a nail set to slip metal flashing up under the siding. Replace nails through both siding and flashing, then apply roofing cement under lower lip of flashing.

Flashing a brick wall usually requires two strips—flashing and counterflashing (Fig. 9F). Chisel out about ¾-in. of mortar between bricks for the lower flashing, then insert one edge of the flashing into the joint and fill with mastic. Apply mastic under lip of flashing against the top of roofing. A few roofing nails may be nailed into roof where the counterflashing will cover them. Fit upper flashing into the next mortar line above the first flashing and hold with 6*d* nails. Seal the lower edge with more mastic.

When extending a roof line, loosen tabs of the existing shingles and slip starter strip under the lowest row of house shingles. Slip top of shingles for patio roof under the starter strip and replace nails through house shingles. Use small pieces of metal flashing to seal joint between patio sides and house roof.

A Flat Screened Roof achieves an open-to-the-sun room (Fig. 11). Space 2 x 6 rafters 48 in. apart and divide them with 2 x 4 crosspieces. Staple screening to the rafters and crosspieces, then cover with 1 x 2 wood strips.





Four Ways to Build with

Once you learn the techniques of working with stone you can erect walls that enhance the beauty of your interior and exterior surroundings

By PAUL COREY

ALL you need to work with man's oldest building material is to have a little ingenuity and muscle and choose rocks that are as big or bigger than your fist and don't crumble in your hands.

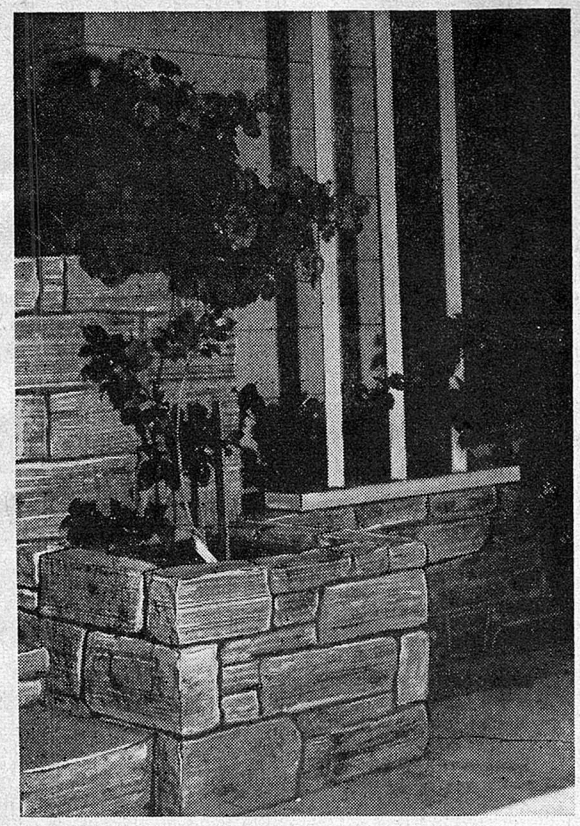
You can shape the stone with a claw or ball peen hammer (Fig. 2) or split it with a hammer and cold chisel or a stone mason's hammer as in Fig. 3. Other tools you'll need when working with stone are a level, tape measure, and trowel, plus a heavy pair of gloves to handle stone and cement.

Whether the stone is cut at the quarry or on the job, professional stone masons usually soften or work the stone by chipping off the square corners as in Fig. 2. Hold the stone on your thigh so the muscles cushion the blows enough so the edges won't split off more than you want them to. Another way is to shape the stone on a bed of sand or cushion the stone with a sack filled with fine sand.

Cut-Stone Walls. Cut stone can only be made from rock that has a pronounced grain so it will split into layers as in Fig. 3.

The pattern of laying up cut stone is either random or coursed. Random means that all the joints are either vertical or horizontal, although they do not have to run continuously either up or across (Fig. 1). When coursed, the horizontal joints are continuous as in the fireplace in Fig. 1.

Plan the wall so it rests on a solid footing. When the stones are laid in mortar, the footing should go below the frost line (at least 36 in. below the surface) and extend out not less than 4 in. on each side of the wall. If there is adequate drainage, the footing does not have to go below the frost line because



A wide range of forms and types of stone offers the home owner many opportunities to use this material in building walls that are decorative and need little maintenance.

STONE

the water will drain away and not get under the wall to freeze. You can provide for drainage by backfilling with cinders or gravel.

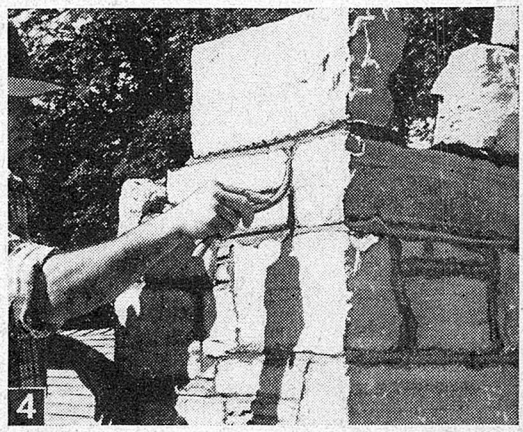
Once the footing for the wall is set, establish a fixed point or line on the footing and build from there. Keep the wall plumb by using the level to check each layer of stone. On long runs use a string to keep the face-line straight. Use your tape measure to maintain an even depth or thickness.

Mortar for laying up the cut stone can consist of two or three parts of plaster sand, one part of Portland cement, and one part lime. Lime doesn't have to be used, but it makes the mortar more plastic. After laying up several stones, run a bent ½-in. conduit along the mortar joint as in Fig. 4 to give it a smooth finish.

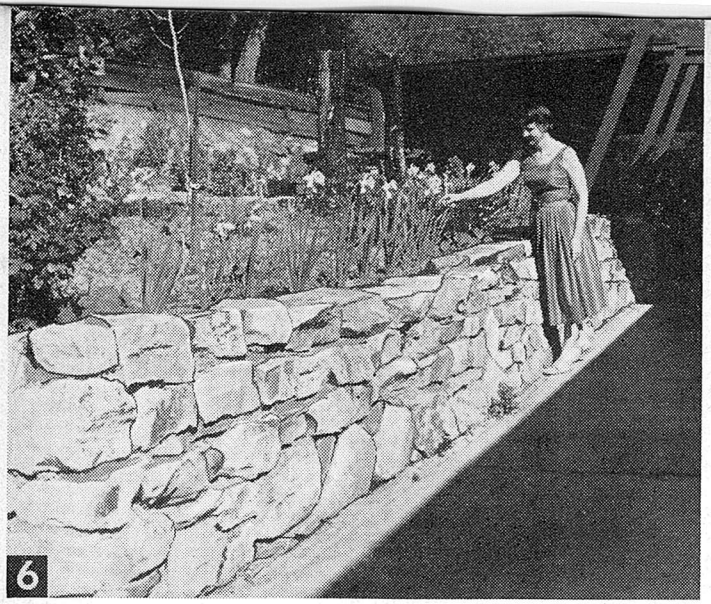
Build the wall against a wood form (Fig. 5) if you are going to use stone for the exterior wall and want to finish the inside surface with another material. Pour the footing and fill the space between the footing, stone, and wood with concrete. For a sturdy wall, imbed ⅜-in. reinforcing steel rods in the space between the wood wall and stone at

Chipping off the sharp corners tends to soften the exposed surface and enables you to recess the mortar line so the joints look uniform.

Cut-stone walls can only be made from rock that has a pronounced grain so it can be split into layers with a hammer and cold chisel.



Tool the mortar joints with a bent conduit pipe to fill in any openings and give the joints a smooth finish.



Random rubble lay walls can be built by eye because small waves in the wall make little difference in the finished job.

Plywood forms nailed between the frame studs hold the mortar so it can set around the frame and give added support to the stone wall.

intervals of 12 to 18 in.

Rubble Walls. This type of wall (Fig. 6) lends itself to stones that are rough and irregular and relies on mass for its attractiveness. Stone masons call this type of wall "random rubble lay." Large stones are rolled into place and the cracks and V-gaps between them are plugged with smaller stones and cement.

The only tool you need for this type of construction is a shovel to dump in the mortar. Wear gloves when you pack mortar in joints where extra fill is needed, because the cement will take all the oil out of your skin and cause it to crack or peel.

This type of wall can be built by eye. If, however, you are uncertain about the accuracy of your vision, stretch a guide string from time to time to check the straightness and use your level to verify the vertical position.

The best mortar mix to use is three or four parts coarse sand to one part Portland cement. You can add one part lime for greater plasticity, but in this kind of wall strength is more important than plasticity.

Random rubble walls must be thick to be effective. A wall 8 ft. high should be from 16- to 24-in. wide at the base. The mass appearance of this wall makes it useful for such things as retaining walls, plant pocket, and fireplaces. You can build a single wall of this type in your house to give it a feeling of solidness.

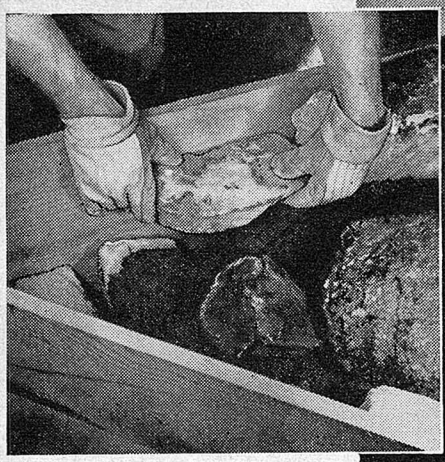
Formed Walls. Random rubble walls usually require considerable stone and cement, but stone masons get around this by using forms for one or both sides to reduce the thickness by a half or more. The fireplace in Fig. 7 was built that way.

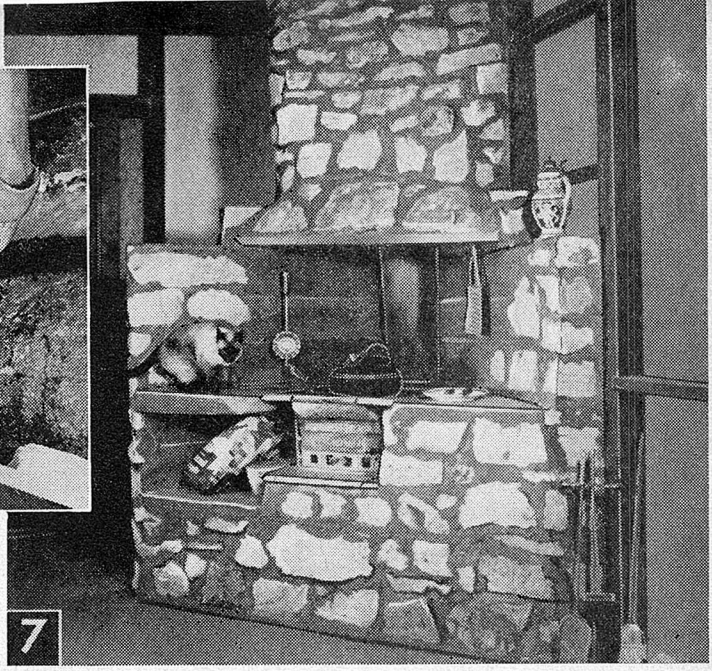
Build the form one board at a time as you lay up the wall. Be sure the form for the exposed surface side is straight and solid so the finished surface will have the appearance of cut stone.

After the form board is set in place, lay the flat surfaces of the stone against it and fill the openings with mortar (Fig. 7). Don't try laying up too much wall before giving the cement a chance to set. A 2-ft. high row of stone is enough for one day. After the cement has set, remove the forms and finish the joints between the stones with a fine grout as in Fig. 8. This grout mix is made up of two parts plaster sand and one part Portland cement.

Another method of building stone walls for a house is to erect the interior and exterior walls around the stud frame (Fig. 5). In this type of construction it is best to ask your building materials dealer or contractor what size the footing must be to support the size of wall you want to erect.

The forms used for this project fit between the studs. Take the inside measurement between two studs and cut a sheet of ¼-in. plywood to this dimension. Nail the edges of the plywood to 1 x 2s and position the frame between the studs so the 1 x 2s butt against the studs and the exposed ends of the firring strips are flush with what will eventually be the inside wall of the house. Use





By laying the flat surface of the stone against wooden forms, you can trim the surface so it looks like cut stone and erect the wall with less mortar and stone.

scaffolding nails to attach the form to the studs.

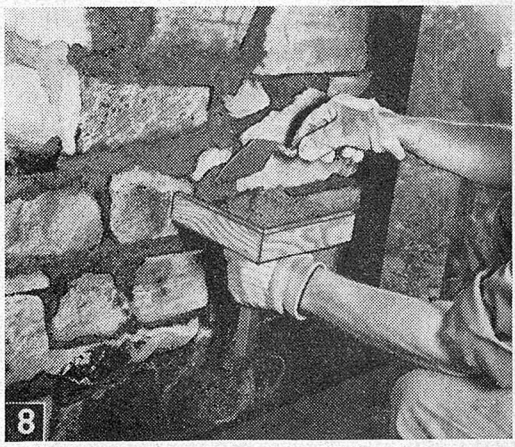
When laying up the stone for the exterior wall, be sure the mortar is against the plywood and around the studs as in Fig. 5. The plywood forms can be removed once the cement sets up. Fill the space between the interior and exterior stone walls with cement or insulation.

Rock Veneer. This material (Fig. 9) can be purchased from a quarry or stone distributor in irregular shaped slabs that are ½ to 1 in. thick and give a house a solid stone look. A ton of this stone will cover about 240 sq. ft. of wall, and with the mortar will weigh about 10 lbs. per sq. ft. when installed.

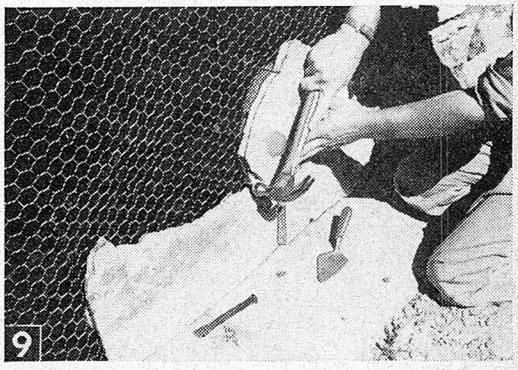
Before you cover an inside wall with stone veneer, be sure the foundation can hold the increased weight. If there is any doubt, brace the joists with 2 x 6s set on concrete piers or ceiling jaeks spaced every 4 ft.

The surface you are going to veneer should have studs spaced 16 in. on centers and covered with wood or plywood sheathing nailed every 2 in. with 8*d* nails. Cover with heavy weight building paper and staple 1-in.-mesh chicken wire over it as in Fig. 9. Use a rich grout, two parts fine sand to one part Portland cement, for adhering the veneer. Butter the back of each slab liberally with mortar and push it against the mesh.

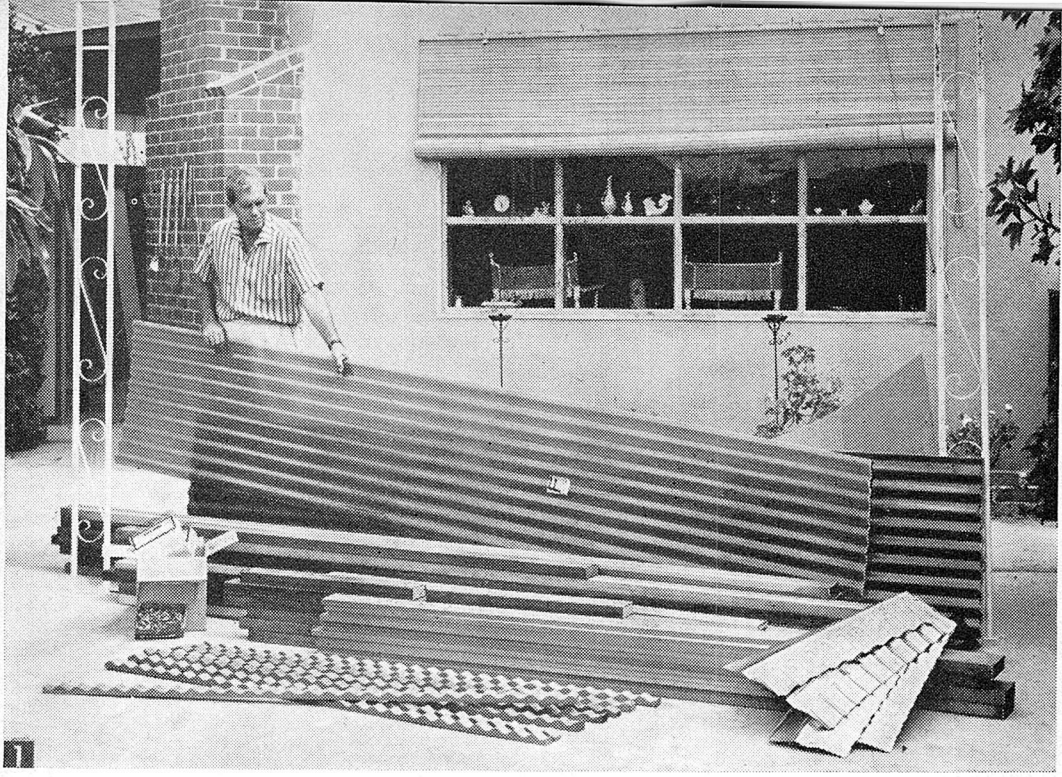
If you are going to veneer the lower part of an outside wall the top edge of the stone surface must be even and well sealed. Caulk the edge and fill any openings that might exist between the stone and the frame surface, then fasten a beveled wood drip strip over it to prevent water from getting behind the stone.



After the wall is erected, use a rich grout to fill in any openings between the stones.



If any veneer stones show a tendency to loosen before the cement sets, drive nails around the edges so the nail heads grip and hold the rock. The nails will be covered when you point up between the stones with grout.



The best fiber glass panel installation job can be done when you use accessories made especially for the panels and sheets that have uniform corrugations and thickness to provide weathertight joints.

The LIGHT Side of

The natural beauty of translucent panels can be used to create decorative effects with color and light

By R. J. DeCRISTOFORO

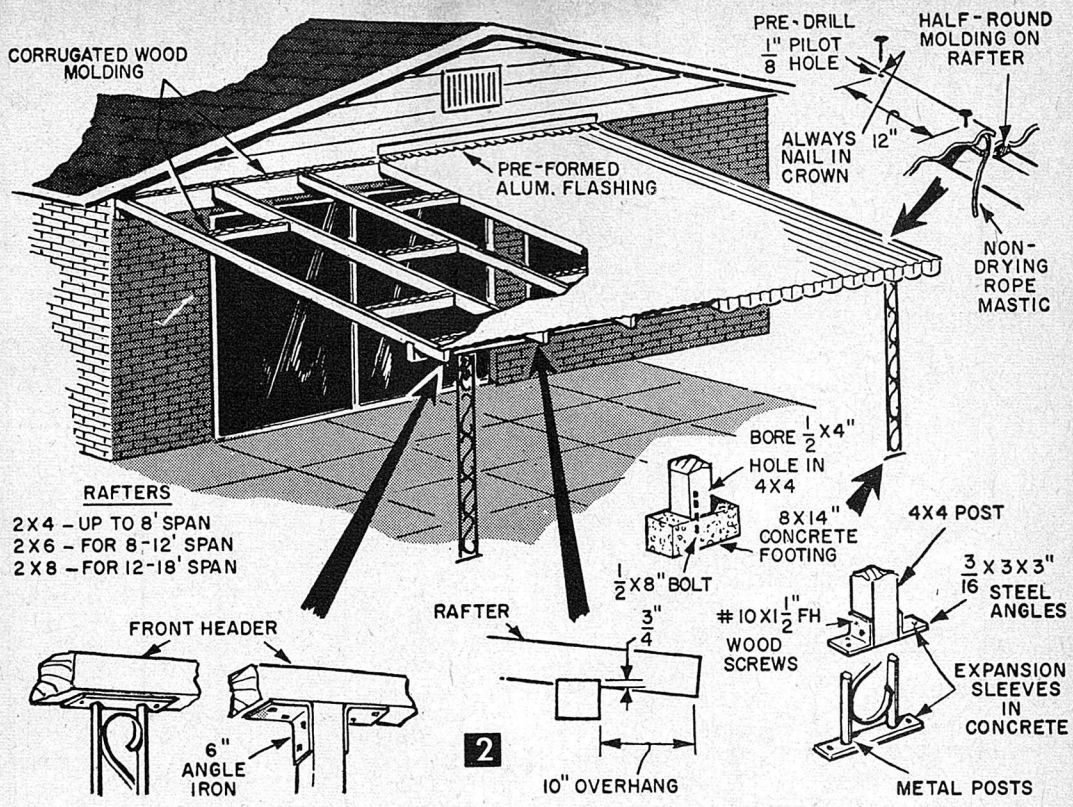
THE structural strength and beauty combined in modern translucent fiber glass and plastic panels enables today's home owner to enhance indoor and outdoor settings with paneled structures that provide soft, glare-free light and do not darken adjacent areas.

These translucent panels are made to order for patios, awnings, sun porches, fences, partitions, shoji screens, room dividers, and many other projects that require light transmission.

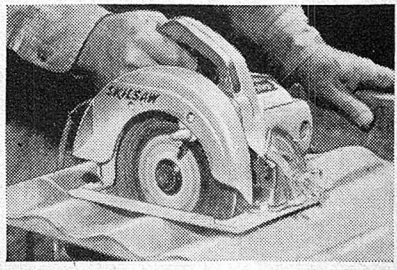
Fiber glass in panels (Fig. 1) or roll form is lightweight, shatterproof, and manufactured in corrugated, shiplap, flat, and other configurations. It stands up well under wet and dry conditions and will not warp or rot. Any dirt or dust that does collect on the smooth surface can be hosed off. Decorative fiber glass and plastic panels used indoors that are clear or embedded with natural materials such as butterflies, leaves, ferns or grasses can be maintained by periodic washing with soap and water or ordinary detergents.

Cost depends on locality and type of structure. In areas where climate is generally mild, framing can be light and less expensive than a more substantial understructure. Material for a typical fiber glass patio cover installed as in Fig. 1 will run about $1 a square foot.

Construct the Patio Cover by nailing or lag-screwing the 2x6 header directly to the house studs (Fig. 2). If the house is masonry, other than stucco, drill holes with a carbide tipped bit and install expansion sleeves to receive the screws. Corrugated wood strips



Decorating

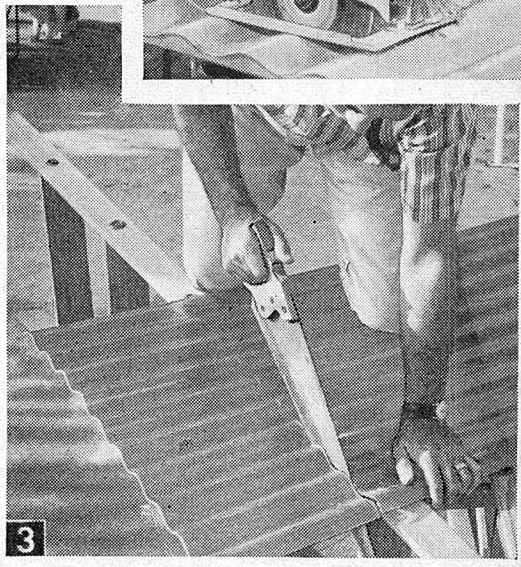


that you can buy or make as in Fig. 1 are placed across the framing to assure a mating fit for the overlapping Filon panels.

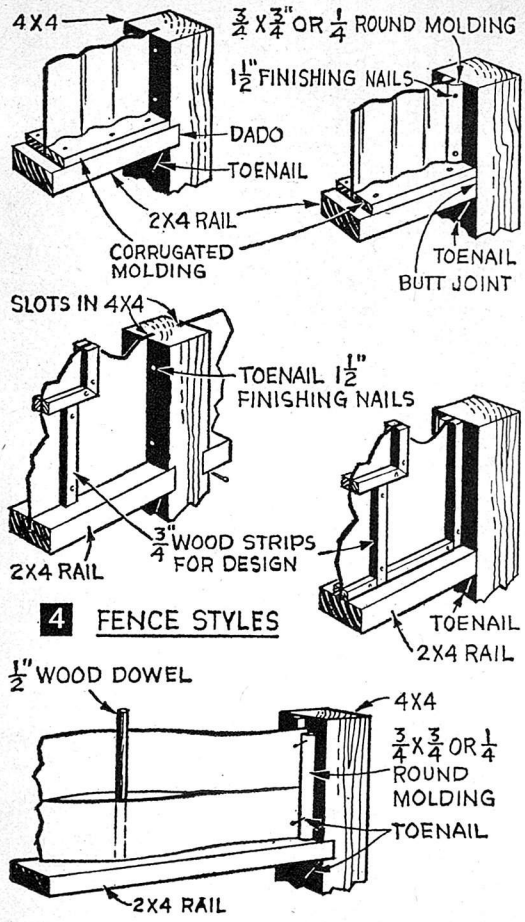
Avoid heat traps by providing sufficient ventilation at the roof of the structure. Outdoor structures that abut the roof of an existing structure should be set 6 to 8 in. below the eaves and about 6 in. back so the warm air can escape. If this brings the patio roof too low, raise it higher than the house roof and support it on braces. Leave vent openings between the sheets in the side valances as in Fig. 6 so air and insects can get through.

Vertical walls can be ventilated by leaving openings at the bottom and top to provide for air circulation. When the wall supports an overhang, ventilation is provided by openings between the beams and rafters. When possible, position the structure so prevailing breezes will give a cross ventilation.

Cut the Panels with either a power saw that's equipped with a Skil *Perma-Grit* blade that will give a finished edge, or with a fine-tooth hand saw (Fig. 3). Mark the cut line on the fiber glass panel with a grease pencil



Let the saw do the cutting, don't force it. Smooth any rough edges with a file or sandpaper worked along, not across, the edge.



or scratch it with a nail or scoring awl.

Before cutting any panel lengthwise, lay them all on the ground so they cover the spread needed. If a panel must be cut to fit, plan to use narrower strips at the ends rather than starting with a full sheet and cutting the last sheet to fit no matter what its width may be. When determining the spread, be sure to allow 2 in. for sheet overlap.

Install the Panels by laying the first panel on the corner, and make sure it is square with the rafter. Allow for at least a 2-in. overhang at the front. If the area to be covered is longer than the panel, work from front to back and with the 4- to 6-in. overlap sealed with a strip of non-drying rope mastic across the corrugations. If you cannot nail the overlap to a rafter, use weatherproof acorn nuts and bolts to secure the two sections.

Drill all nail holes with a ⅛-in. bit to avoid localized crazing marks that can be caused by nailing directly through the fiber glass. Nail only through the crown of the corrugations, and every 12-in. along the rafters, and every second or third corrugation along the headers, braces, and rafters. Where panels overlap, nails should pass through the rope mastic to ensure a weatherproof joint.

In areas where high wind velocity or heavy snow loads must be considered, use special washers of laminated metal and neoprene under each nail. For additional strength, space the aluminum nails every 6 to 8 in. along the rafters.

Design Fence Frames (Fig. 4) to fit standard widths and lengths of the fiber glass panels. The styles of fences built with these translucent panels are unlimited. Use flat or corrugated panels or combine both for a more unusual effect.

The basic elements of construction are in Figs. 4A, B, and C. If possible, base your design on the standard sizes of the panels to avoid unnecessary cutting. Use 4x4 wooden posts and space them 8 ft. apart. The posts should be treated with creosote and set in concrete 2 ft. deep. Use grooves or wood stops to hold the panels in place.

A Low-Maintenance Greenhouse (Fig. 5) sheathed with nine sheets of 10-ft. translucent panels admits glare-free, shadow-free daylight and diffuses it evenly over every inch of growing area. These panels also minimize heat loss in winter and reduce Sun heat in summer.

First step is to dig a 6x8-in. trench around the slab area for a footing (Fig. 5A). The cement form should extend 2 in. above ground level, with ½ x 6-in. bolts placed in the cement when the slab and footing are poured.

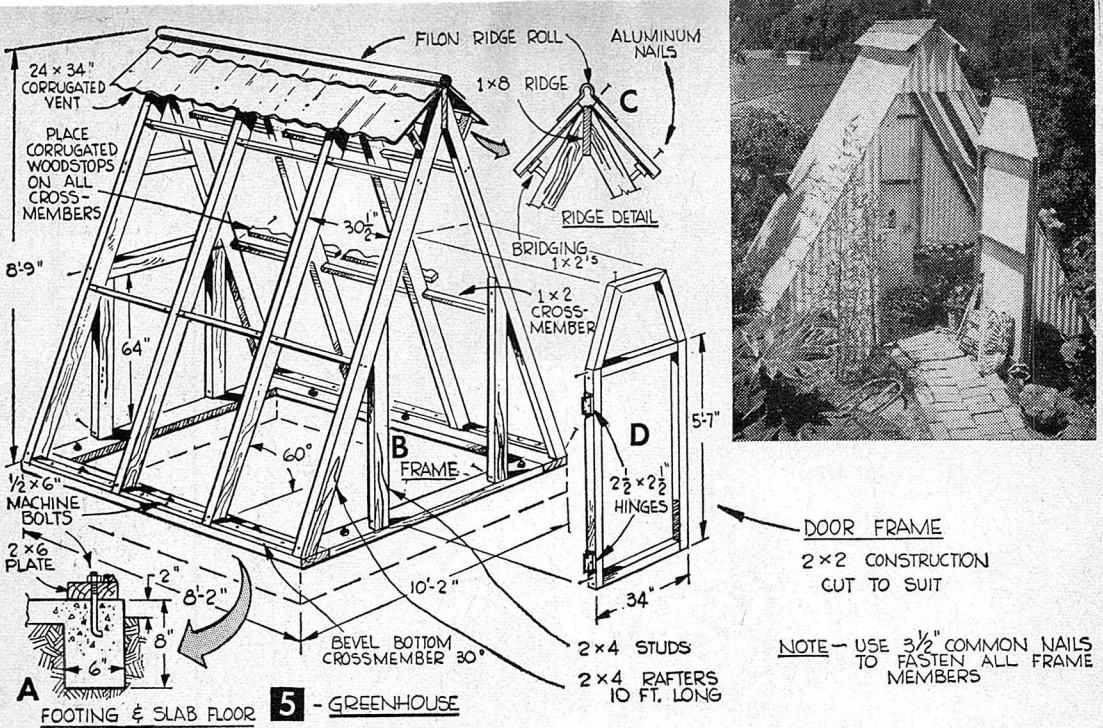
Bevel the top and bottom of the 10-ft. long rafters and nail the 1x2 crossbraces to the rafters at the bottom and at 4 and 9 ft. heights with common nails (Fig. 5B). Raise the sides and toenail to the 1x8 ridge member (Fig. 5C) and bottom sole plate. Install the back braces and nail the corrugated wood stops to the crossbraces and rafters.

Cut six 9-ft. panels out of the 10-ft. sheets. Place each of the 34-in. wide panels on the rafters using one corrugation overlap between panels. Insert rope mastic between the panels at each overlap before nailing to assure a weatherproof joint. Nail every 12-in. on the rafters and through the crown of every third corrugation over the crossbraces.

Build the door frame out of 2x2s as in Fig. 5D and attach the framepieces with angle straps. Screw the 2x2-in. hinges on the door frame and to the shelter framework. Cut three pieces from the remaining panel to fill in the areas on the sides and top of the door frame.

Only a Light Understructure is required for a fiber glass awning (Fig. 6) that permits soft diffused light to stream through your windows. Make a sketch of your window to scale and use these dimensions as a base to lay out the fiber glass sections (Fig. 6A).

Make the frame by cutting ¾ x ¾-in. aluminum angle to length, then notch and bend the corners as in Fig. 6B. For the header, rip



5 - GREENHOUSE

a 1½ x 1½-in piece of pine at a 45° angle and cap it with an aluminum angle. Assemble the frame with ½-in. aluminum bolts and fasten the top panel to the frame with ⅝ x 8-in. sheet metal self-tapping rust-proof screws.

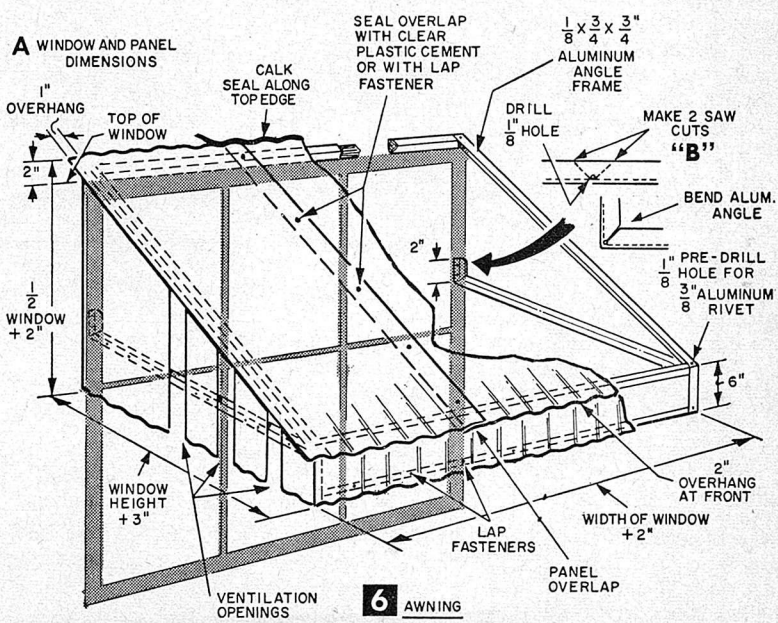
Use 3-in aluminum nails to attach the wood header 2-in. above the window frame. Space the drilled holes that go through the awning and top edge 6-in. apart for the 1-in. aluminum wood screws that are used to join the roof to the header. Fasten the awning to the building with 4-in. wood screws to make it secure.

Interior Uses for fiber glass and plastic panels include fixed or movable dividers or luminous ceilings that give you soft wall-to-wall lighting.

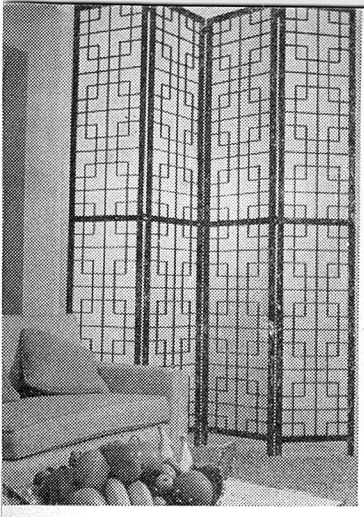
Illuminated ceilings (Fig. 8) diffuse the light, spreading it rather than allowing direct beams to concentrate in one area. This soft lighting can be used to brighten the bath room, kitchen, or hallway and eliminate many shadows and harsh glare.

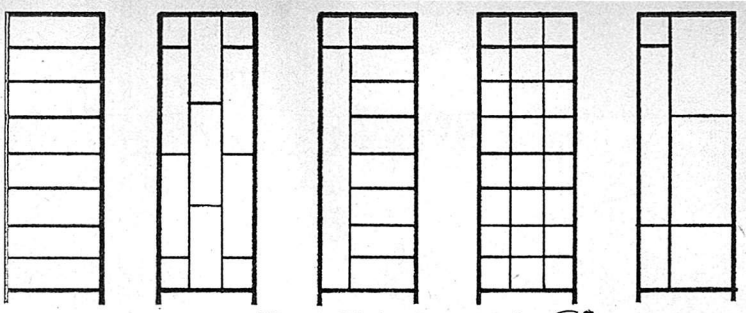
Translucent panels inserted between the studs (Fig. 8A) or dropped from the ceiling (Fig. 8B) can be supported with aluminum or 1 x 3 wood strips. Install the fixtures so each lamp spreads light in a wide area.

Panels may be arranged in any width up to 3 ft., and the length can be up to 10 ft., providing the panel is reinforced so it will not bow. Aluminum extensions used to drop the ceiling can be ordered from the J. C. Braun

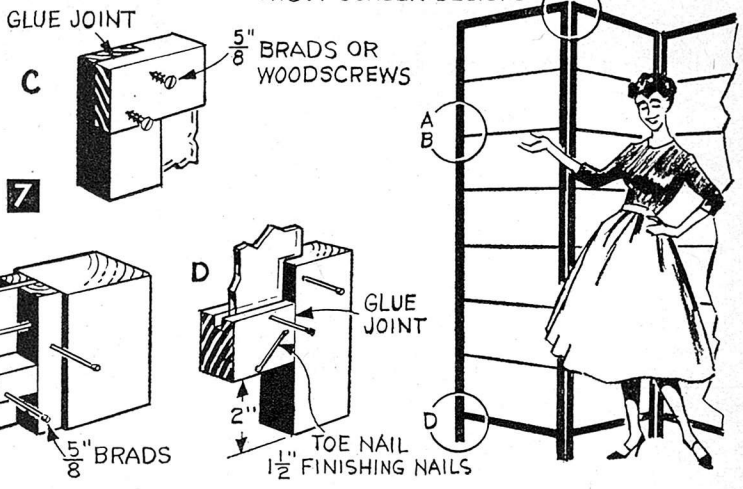


6 AWNING





SHOJI SCREEN DESIGNS

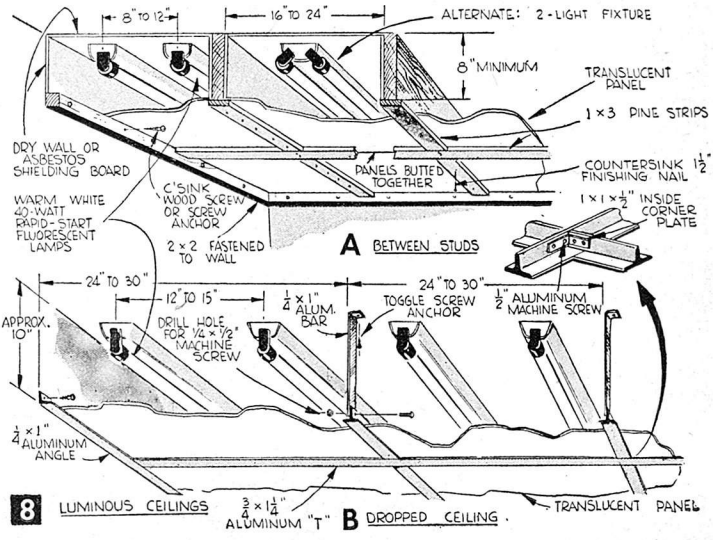


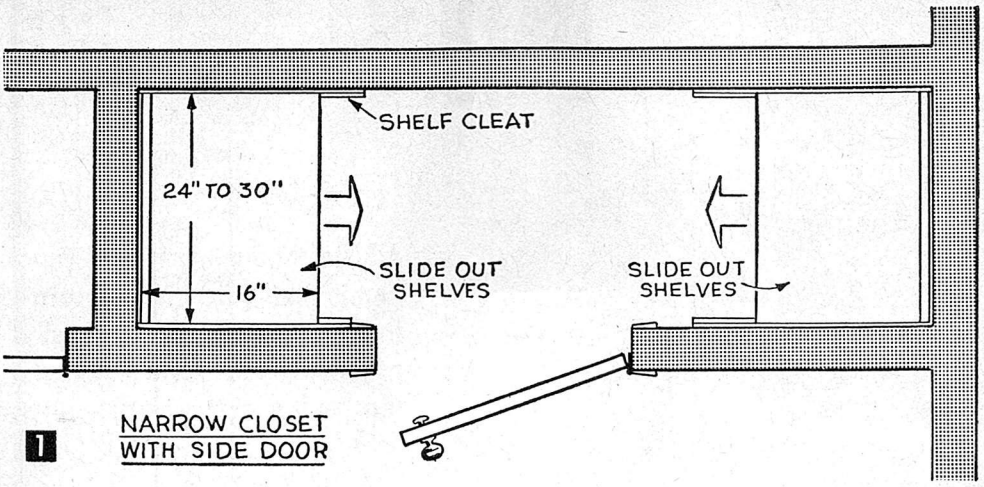
Company of Skokie, Illinois.

Modern Shoji Screens (Fig. 7) can be made of solid color panels or those imbedded with decorative materials. Precut the frame pieces to length, completely assemble the components on a flat surface, and check for correct fit without nailing any of the parts. When everything fits properly, finish them individually with a good grade of flat black enamel. After they dry, assemble with finishing nails or 5/8-in. *fh* wood screws.

Using Fig. 7A frame construction requires that the frame be completely assembled around the panel before the corners are secured. Frame detail in Fig. 7B shows how the panel can be held in place with 1/4 x 3/8-in. window parting stock. Use 5/8-in. finishing nails to attach the stock to the panel and 1x2 frame. Drill pilot holes spaced 4 to 6-in. apart and drive in the finishing nails.

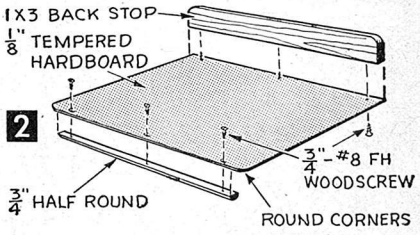
Any looseness or rattle of the panel can be eliminated by filling excess spaces with a paste wood filler or window putty. Set the hinges about 6 or 8 in. from the top and bottom, and center the third hinge. Attach hinges to one frame and mark the position on adjoining frame after butting frames.





1 NARROW CLOSET WITH SIDE DOOR

Make Closet Space Do Double Duty

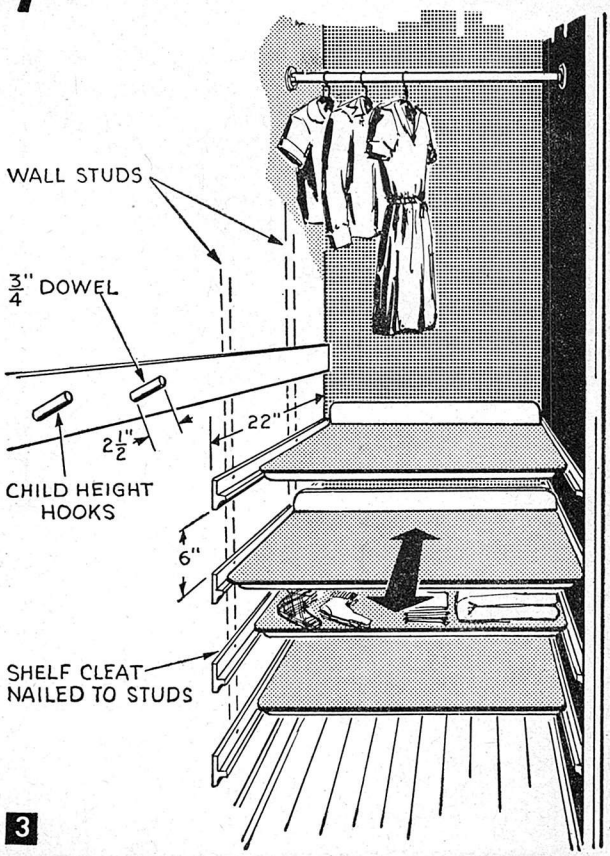


2

BY making a few simple changes in a dead-end closet you can use it for hanging garments and still have low shelf space for horizontal storage as in Fig. 1. You'll need several lengths of standard shelf cleats, some 1 x 3-in. lumber for backstops, a ¾-in. half-round molding for the shelf-drawer pull and a panel of ⅛-in. tempered *Presdwood* for the shelf-drawer pieces, some finishing nails and small screws. If it is a child's closet, you'll need a strip of chair rail molding and some ¾-in. dowel for the clothes hooks shown in Fig. 3.

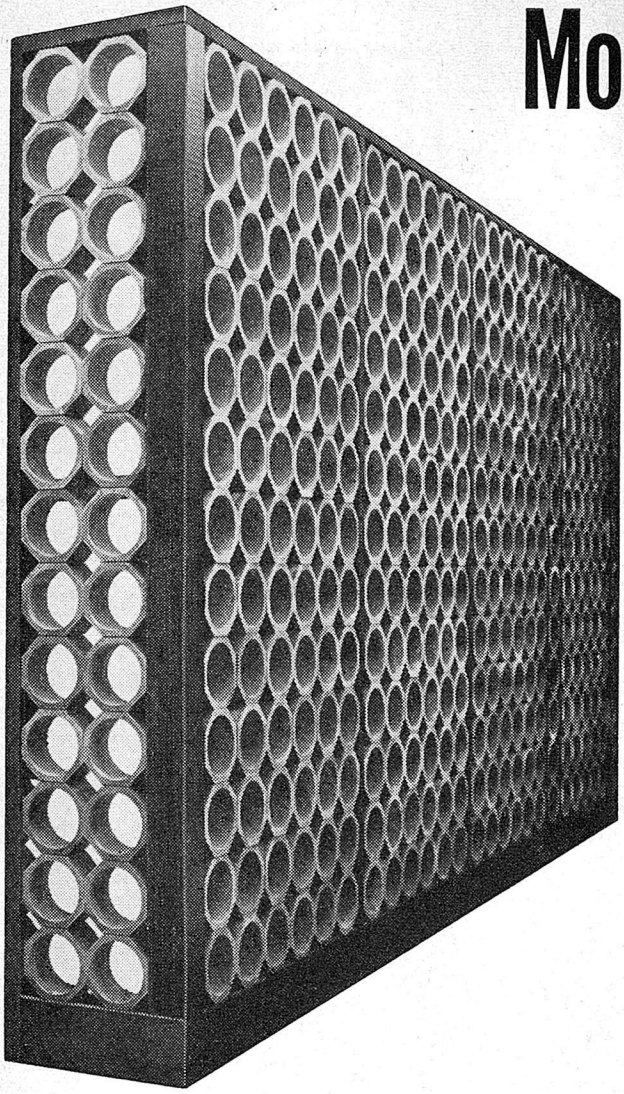
Cut the shelf cleats to needed length and nail to the wall studs, spacing the shelf-drawers about 6-in. apart as in Fig. 3. With the shelf cleats in place, cut and fit the Presdwood so it has about 1/16-in. clearance on the sides. Drill holes and countersink them for the screws; then fasten the half-round drawer pull and 1 x 3 backstop to each panel as in Fig. 2.

For the small fry, cut the chair-rail molding to fit the side wall of the closet as in Fig. 3; then drill ¾-in. holes on a slight angle and glue the clothes pegs in place. Locate the wall studs and nail the chair rail to the side of the closet at the proper height for your child.—D. M. S.



3

Modernize with



Add to the appearance of your home and yard with decorative blocks that can be easily intermixed to form interesting and practical partitions

By FRANK HEGEMEYER

YOU don't have to be a skilled brick mason to install this lightweight decorative stone block that can be used for home and yard improvements to create a feeling of privacy without sacrificing air or light.

The only tools you need are a hammer, saw, level, straightedge, steel and wooden squares, and a few tubes or cans of mastic.

The block forms used here (Fig. 1) are compounded of cement and micro-ground minerals. Similar in texture to normal grey cement, the blocks, a product of General Concrete Products, Inc., 15025 Oxnard St., Van Nuys, Calif., are weather resistant and require no special care. However, they can be painted with an exterior masonry paint if you want to achieve a special color effect.

Because of their lightweight, which averages around 12 lbs./sq. ft. of block wall area, no special footing or foundation is required, providing the walls do not exceed 6 ft. in height. If the wall is to be higher, check with your lumber or building materials dealer to find out about the required outdoor footing or how much weight your flooring can safely carry per square foot.

To work out your own pattern designs make several cardboard cutouts, drawn to half scale, of each size and shape and arrange them on a flat surface until you get the desired pattern. The designs shown in Fig. 2 were worked out this way. Some of the more popular patterns (Fig. 3) are those which are the easiest to lay. The individual blocks used in the patterns can be identified by the circled letters which correspond with those indicated in Fig. 1.

Frame measurements must be precise and the upright members aligned on a true vertical to the base. Dimensions of frames used here, as designated in the Materials List for the drawings, are actual size and may be changed to meet your requirements.

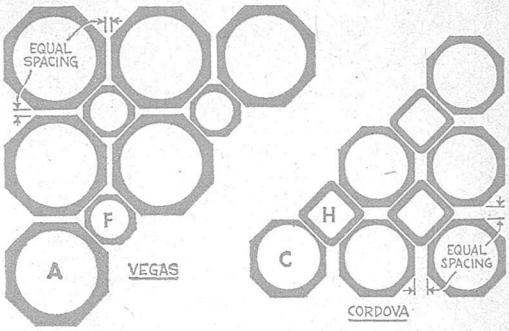
Making the Frames. To determine the correct size of any given frame for patterns made up of the same size and shape of blocks (Fig. 5), arrange two boards on a flat surface at a 90° angle to each other and lay a row of blocks alongside each other until the required height and width is reached. When sawing the frame boards to length, allow about a ¼-in. maximum joint to each six linear foot of stone.

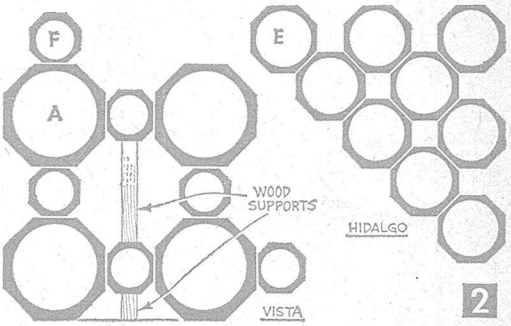
Decorative Block Panels

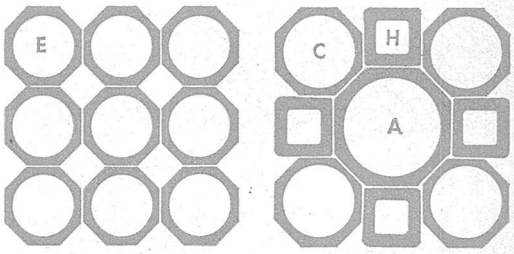
Patterns which place the block joints at a 45° angle (Fig. 4-6) require special bracing. Because of an expanding action that takes place in the frame when the block is laid, cross braces (Fig. 4A-6A) are nailed across the frame to prevent the sides from bending outward. The braces can be removed 24 hours after the blocks are laid. A 3⅝-in. square post does not require bracing.

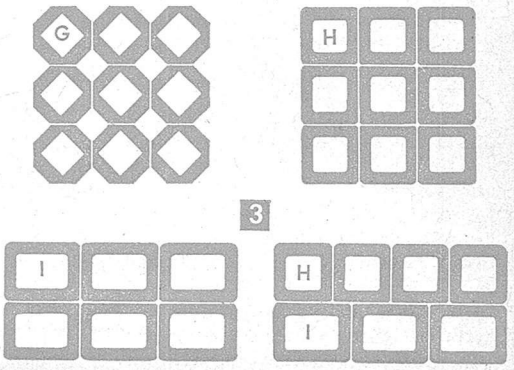
The panel wall (Fig. 7), which is 7 ft. high, can be made any length, depending upon available space and type of floor construction. Frame material used in this panel is cut from 1⅝ x 3⅝-in. stock and divided off in five sections by uprights. Two of the uprights extend to the ceiling for lateral support. Corner braces, ½ x 2-in., are used to anchor the top plates to the extended uprights. These uprights are fastened to the ceiling joists that run parallel to the panel.

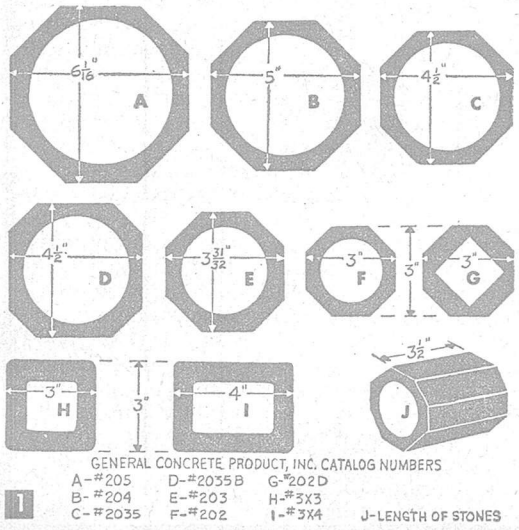
The room divider (Fig. 8) can be attached to a wall, wall stud, or the floor. After you make the inner frame (Fig. 8A), screw-fasten the unit to the floor with three #12 x 3-in. *fh* screws and to the wall stud with one #12 x 4-in. screw. If no wall stud is available, attach the frame to the wall with a toggle bolt wall fastener, available at lumber and hardware stores. Sand all surfaces of the frame with No. 2/0 paper and apply a coat of interior primer. When dry, smooth with No. 000 steel wool. Remove all dust and apply two coats of an interior enamel to the inner surfaces of the frame and facing strips.

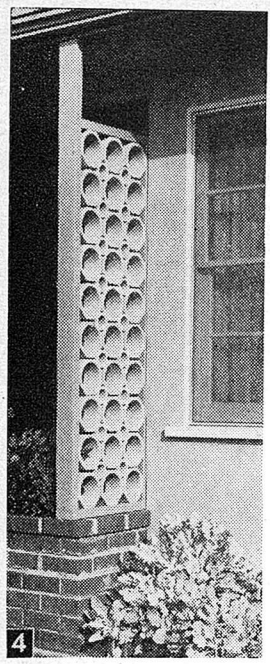


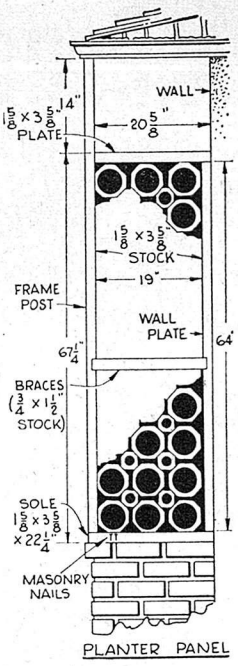




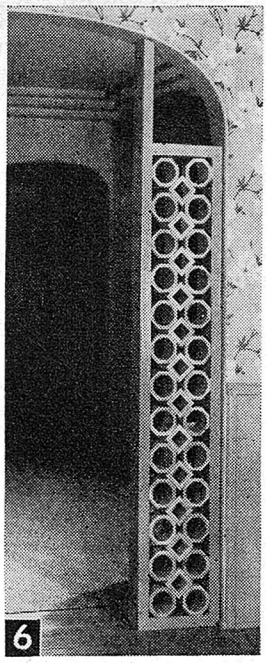


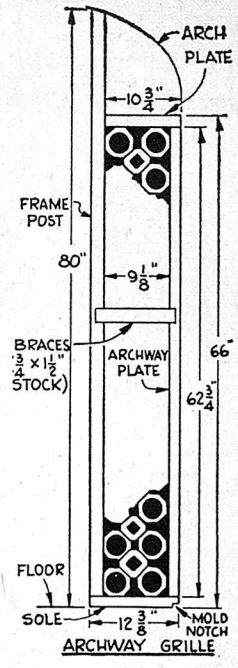






Planter panel adds to the appearance of the porch and prevents the late afternoon Sun from penetrating into the window at the right.





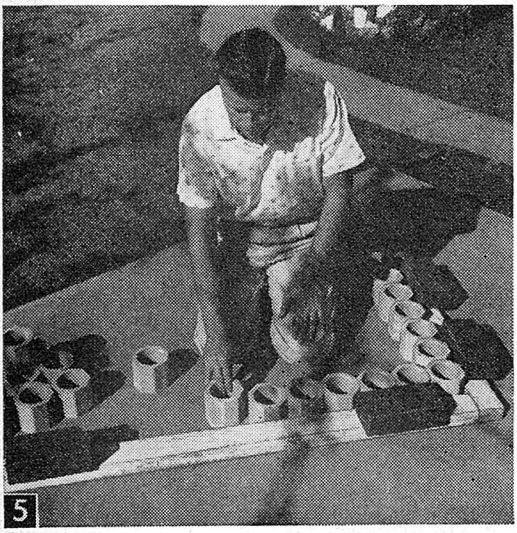
An otherwise plain archway is brought up-to-date with grilles made of square and octagon shaped stone blocks.

MATERIALS LIST—PLANTER PANEL

No. Req.	Size and Description (all dimensions in inches)	Use
1	1⅝ x 3⅝ x 81¼" fir or hemlock	frame post
1	1⅝ x 3⅝ x 64" fir or hemlock	frame upright
1	1⅝ x 3⅝ x 22¼" fir or hemlock	frame sole
1	1⅝ x 3⅝ x 20⅝" fir or hemlock	frame plate
1	¾ x 1½ x 22" pine	brace

MATERIALS LIST—ARCHWAY GRILLE

No. Req.	Size and Description (all dimensions in inches)	Use
2	1⅝ x 3⅝ x 80" fir or hemlock	frame posts
2	1⅝ x 3⅝ x 66" fir or hemlock	frame uprights
2	1⅝ x 3⅝ x 12⅜" fir or hemlock	frame sole
2	1⅝ x 3⅝ x 10¾" fir or hemlock	frame plate
1	½ x ¾ x 64" pine (optional)	baseboard molding
2	¾ x 1½ x 12" pine	horizontal braces

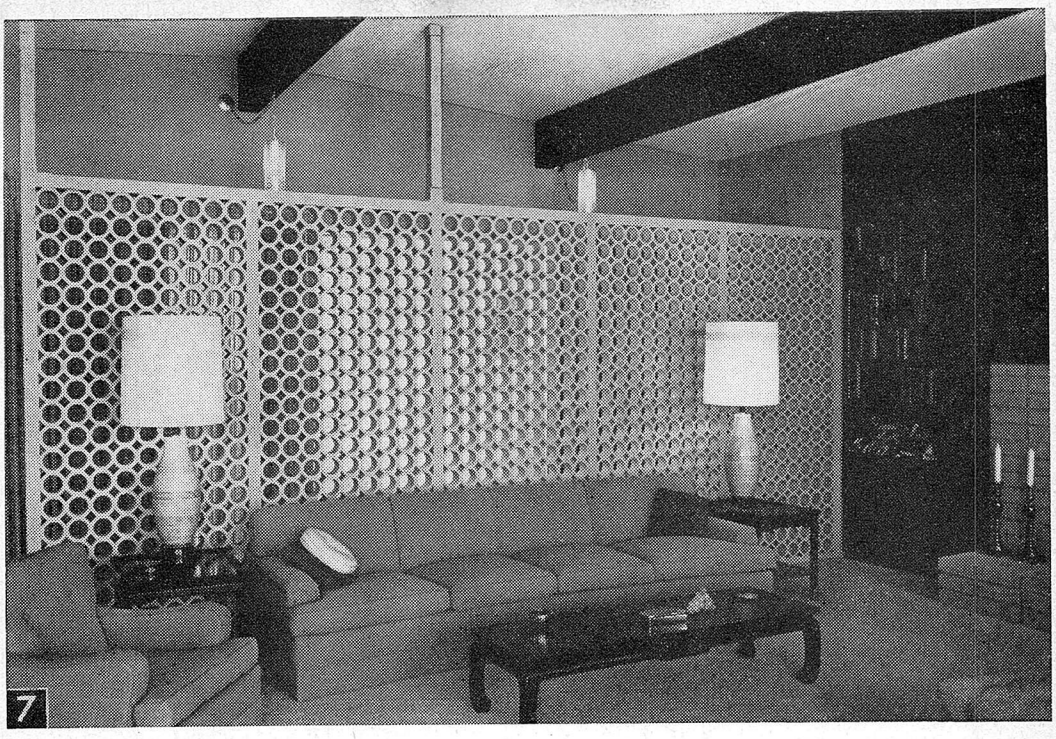


Paving bricks prevent boards from shifting when laying out stone blocks and make it possible to determine the correct size of the frame.

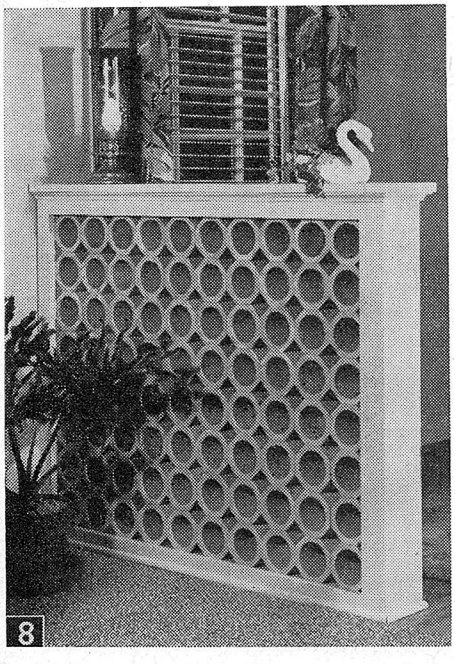
Install the blocks after the paint is dry. After 24 hours attach the other facing strip and molding. Recess the nails and apply a coat of primer. Fill all imperfections with spackling putty. Remove the excess spackle by sanding and repeat the enameling process.

Construction of a frame for a porch panel (Fig. 9) often results in a space at the top that has to be filled in with a filler board or a cover plate. By using a 3⅝-in. square corner post for the frame (Fig. 9A), it is not necessary to use a re-enforcing brace. Toe-nail the top of the post to the porch beam. The straightedge (Fig. 9B) helps keep the face sides and top of the blocks aligned.

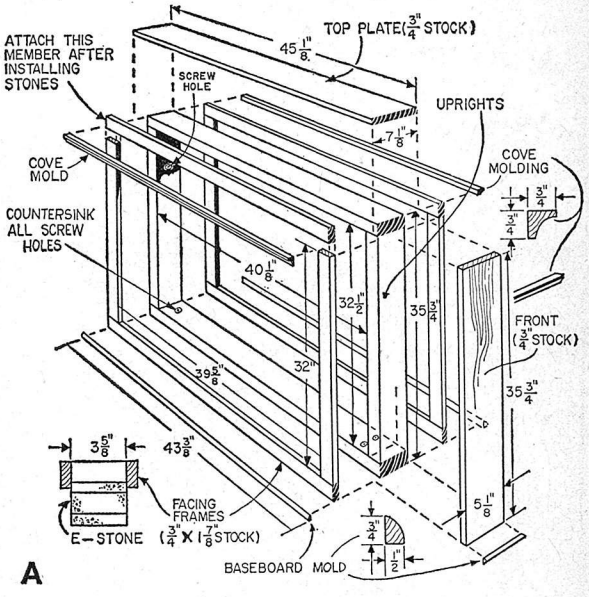
The frame for a patio panel (Fig. 10) is installed between the existing posts supporting an overhead covering in a corner of the garden. The lower portions of the posts (Fig. 10A) are saturated with creosote and imbedded at least 18 in. in the concrete piers. The center of the frame is supported by a 9 x 9-in. concrete pier and a wooden block



Vented free-standing panel allows light to penetrate and does not interfere with the efficiency of air conditioners.

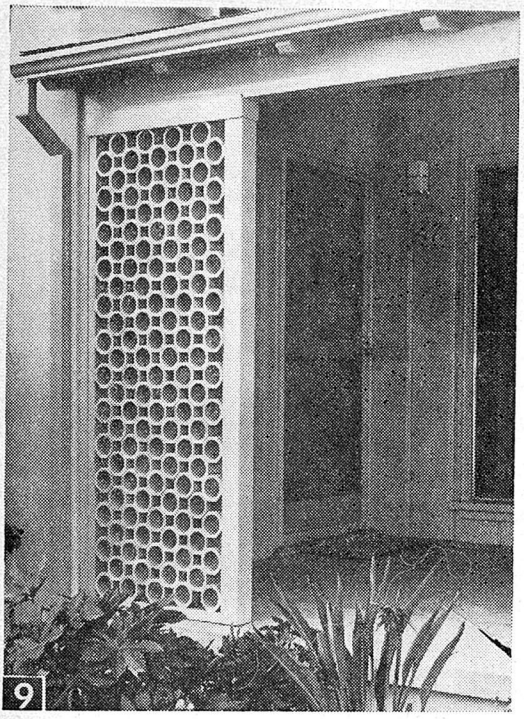


Room dividers can be installed almost anywhere because the lightweight stone, in many instances, requires no extra foundation.

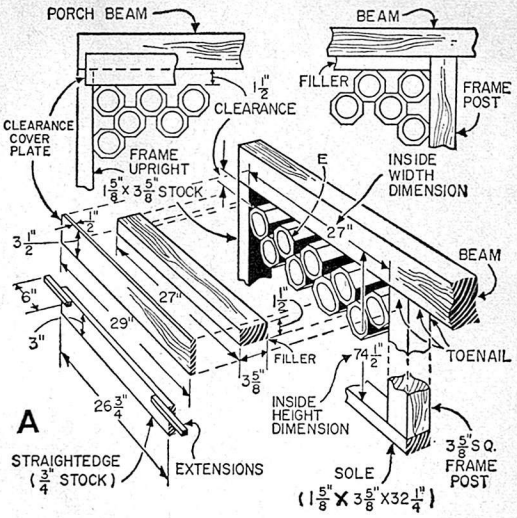


MATERIALS LIST—ROOM DIVIDER

No. Req.	Size and Description (all dimensions in inches)	Use
2	1⅝ x 3⅝ x 32½" fir or hemlock	frame uprights
1	1⅝ x 3⅝ x 43⅜" fir or hemlock	frame bottom
1	1⅝ x 3⅝ x 43⅜" fir or hemlock	frame plate
4	¾ x 1⅞ x 32" pine	vertical facings
4	¾ x 1⅞ x 43⅜" pine	horizontal facings
1	¾ x 5⅛ x 35¾" pine	front piece
1	¾ x 7⅛ x 45⅛" pine	top plate
1	½ x ¾ x 98" pine	baseboard molding
1	¾ x ¾ x 98" pine	cove molding
3	#12 x 3" *fh* screws	fasteners
1	#12 x 4" *fh* screws	fastener

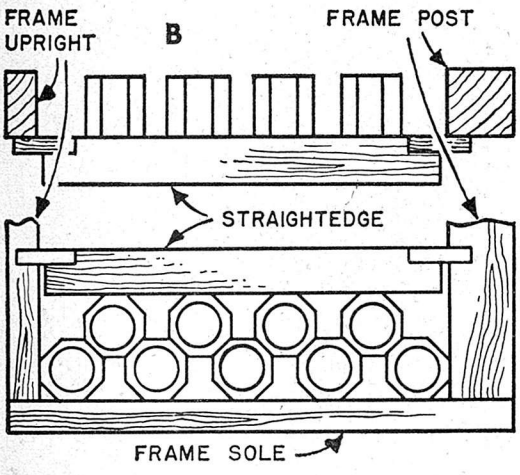


Porch panel provides some privacy. Space between the top row of blocks and the porch beam is finished off with a cover plate.



MATERIALS LIST—PORCH PANEL

No. Req.	Size and Description (all dimensions in inches)	Use
1	3⅝ x 3⅝ x 74½" fir or hemlock	frame post
1	1⅝ x 3⅝ x 74½" fir or hemlock	frame upright
1	1⅝ x 3⅝ x 32¼" redwood	frame sole
1	1½ x 3⅝ x 27" fir or hemlock (optional)	filler
1	½ x 3½ x 29" pine (optional)	cover plate
	STRAIGHTEDGE	
1	¾ x 3 x 26¾" pine (length optional)	body
2	¾ x ¾ x 6" pine	extensions



that is attached to the pier with an anchor bolt. Allow the concrete to harden for 48 hours before installing the blocks.

Laying the Stone Blocks. Block patterns having vertical and horizontal joints are the easiest to lay because they touch on all four sides and support each other.

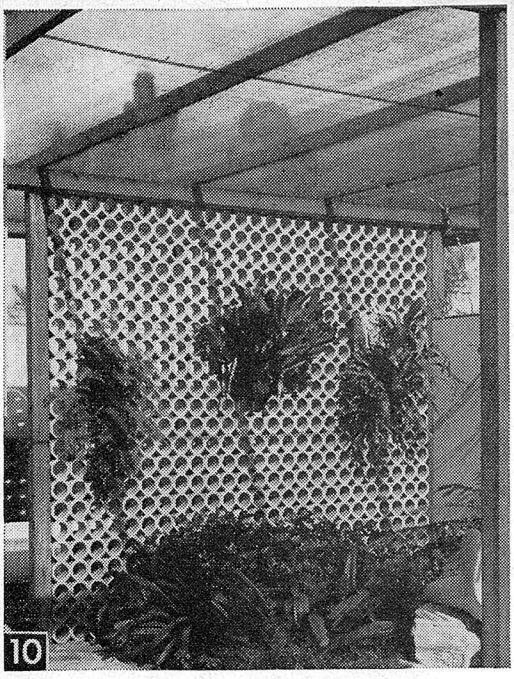
Apply a ⅜-in. wide ribbon of mastic at the left and bottom surfaces of the block that contacts the frame or another block. Allow ½ in. at each end of the block for expansion of the mastic and to avoid waste. Repeat this process with each block that rests on another block or on the frame. Use your straightedge to check alignment (Fig. 9B).

The blocks can be slid slightly to correct minor errors in alignment for about an hour after laying, but this should be done only when necessary. For the first 12 hours until the mastic hardens, avoid moving or jarring the blocks. Excess mastic can be removed the following day with a sharp knife or chisel.

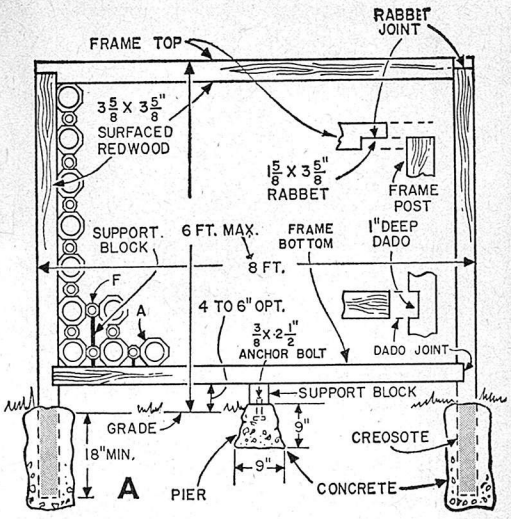
Patterns that place the joints at 45° angles require particular care in spacing the first row of blocks to maintain accuracy in each of the following rows. Designs that require open spaces beneath certain blocks (Fig. 2 "Vista") should be held up with temporary filler blocks of wood to support the stone blocks.

Another way to build a block panel (Fig. 11) is to pre-assemble the sections on a flat surface and use both a wood and steel square to maintain accurate overall dimensions. These sections (Fig. 11A) can consist of two smaller blocks adhered to a larger one, or made up to a 12-in. square with intermixed or all of one kind of stone block.

These suggestions will give you a start. You can begin your custom designing where we left off.

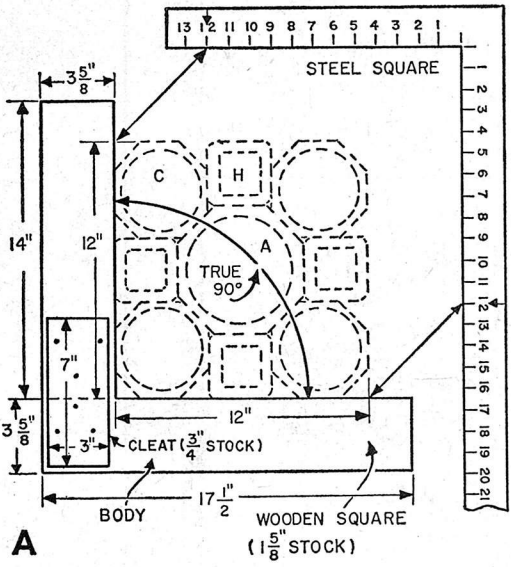


Patio panel adds to the appearance of the back yard and gives privacy without sacrificing air or light.



MATERIALS LIST—PATIO PANEL

No. Req.	Size and Description (all dimensions in inches)	Use
2	3⅝ x 3⅝ x 88" redwood	frame posts
1	3⅝ x 3⅝ x 90¾" redwood	frame sole
1	3⅝ x 3⅝ x 96" redwood	frame plate
1	3⅝ x 3⅝ x 5" redwood	support block
1	⅜ x 2½" anchor bolt	pier to block

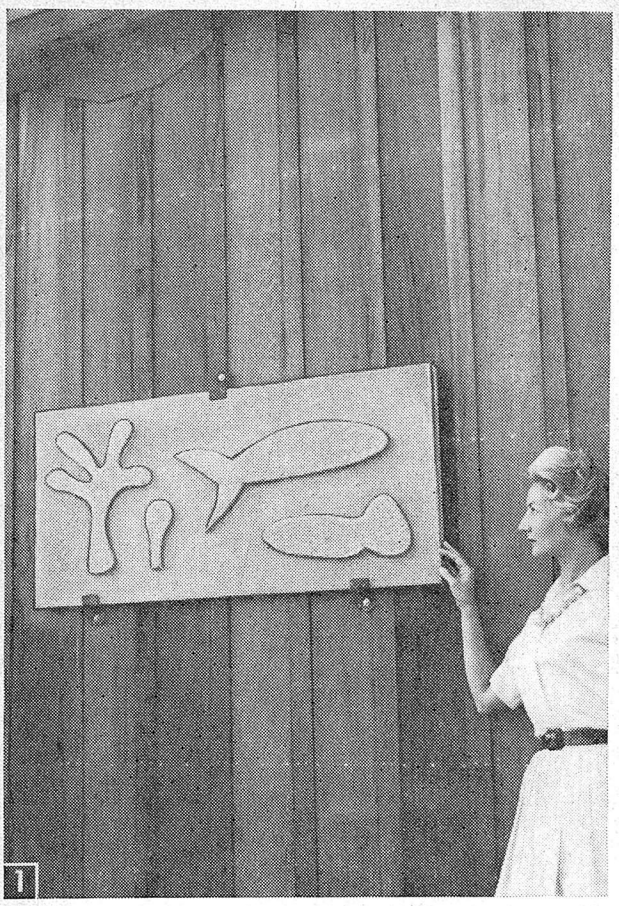


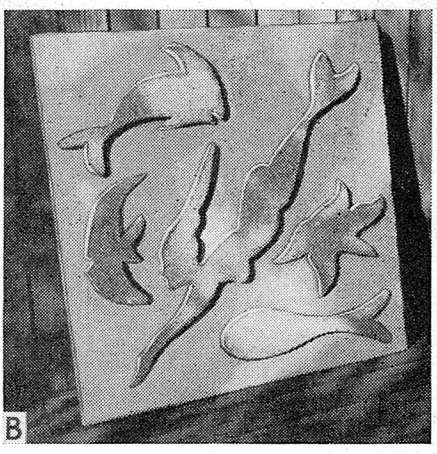
MATERIALS LIST—WOOD SQUARE

No. Req.	Size and Description (all dimensions in inches)	Use
1	1⅝ x 3⅝ x 17½" fir or hemlock	body
1	1⅝ x 3⅝ x 14" fir or hemlock	tongue
1	¾ x 3 x 7" pine	cleat

Misc. nails, brads, floor plate anchors, spackling putty, sand paper, mastic, finishing materials.
Unless otherwise specified, all parts are cut from kiln-dried Douglas Fir or hemlock. All stock is milled four sides.

Steel and wood squares are used to maintain accurate overall dimensions in pre-assembled stone block sections.





It's possible to duplicate sculptured works of art with special blends of concrete mixes.

Custom-Crafting Decorative Concrete

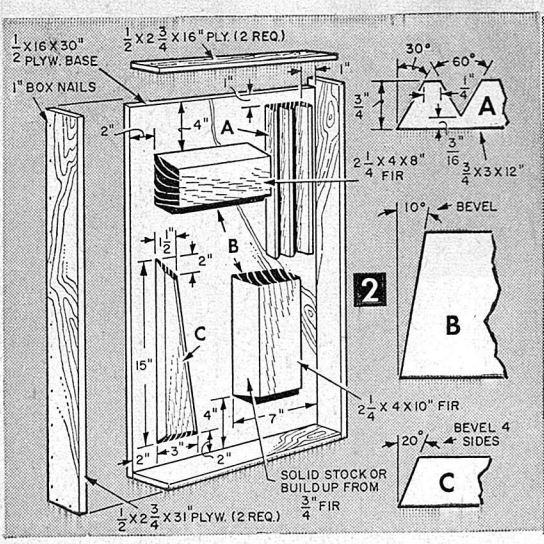
Try a few small projects and you'll realize that concrete is more than a heavy hand-made stone good only for walks and driveways

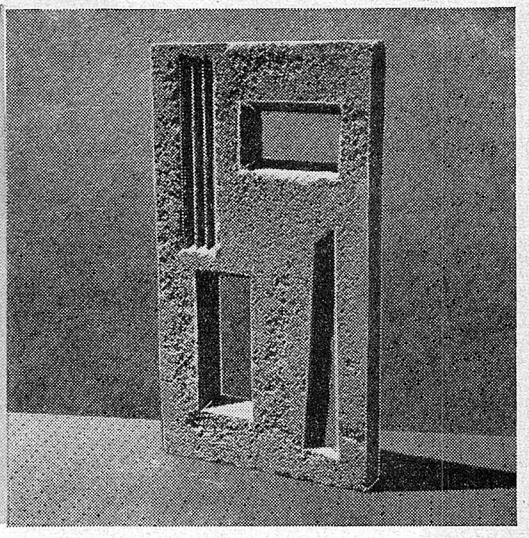
By R. J. DeCRISTOFORO

THERE are an unlimited number of intriguing shapes that can be created with a special, light concrete mix and used to enhance any indoor or outdoor setting.

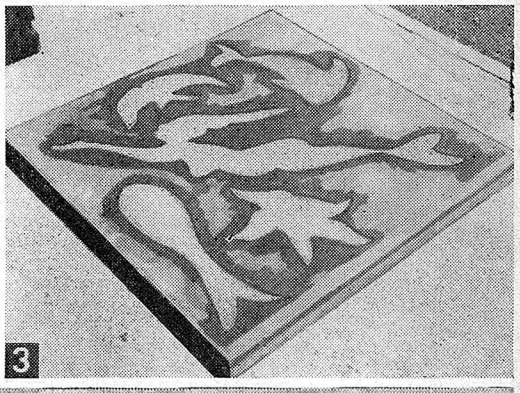
Texture can be controlled by the smoothness or roughness of the form surface and by the amount of tamping done after the mix is poured. On lightweight concrete mixes you can actually work the surface after the pour sets and is removed from the form.

Common Concrete Mix, consisting of pebbles and/or larger stones, sand and cement,

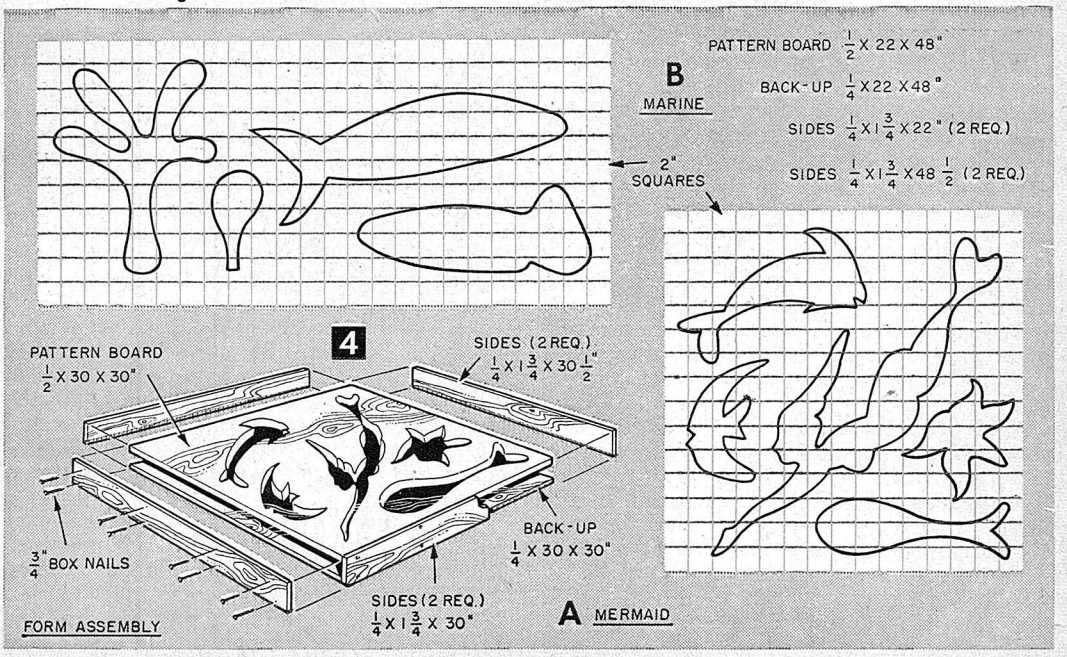


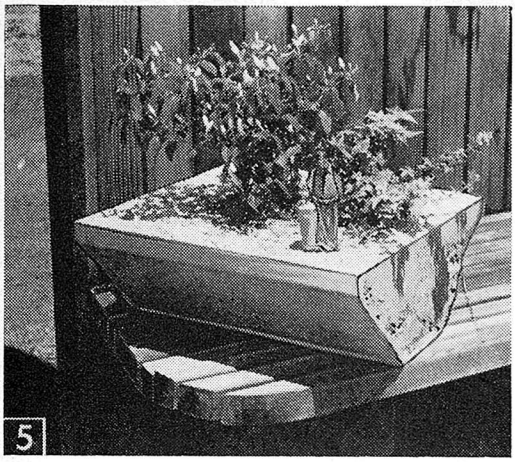


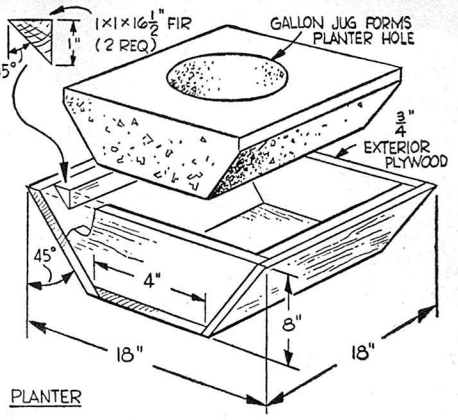
is not the only material you have to work with. This is fine if you want weight and the structural strength it provides (Figs. 1B and 5), but for wall plaques (Figs. 1 and 2), heads, lamp bases and similar projects, you can develop a lightweight concrete merely by substituting vermiculite for the ordinary concrete mix. Vermiculite is sold at garden supply stores as a plant aid and is used for breaking up hard, clay-like soils. It also forms a base for acoustical plaster.

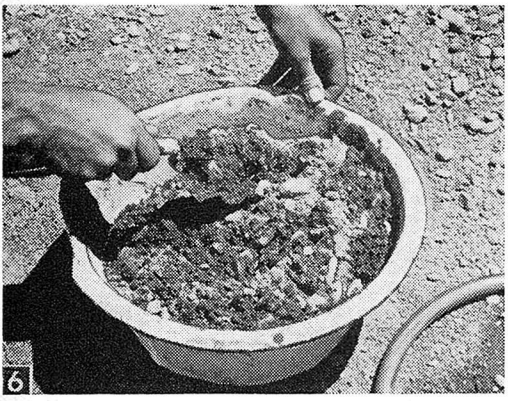


After all but the pattern board is removed, use a stiff brush carefully to remove excess concrete around the edges of the cut-outs.









Small batches of concrete can be thoroughly dry-mixed in an old pan before adding water.

When using it as the aggregate for a concrete mix, it can be used with cement alone or combined with sand. It can be mixed 4-1 without sand and still have adequate strength. Including sand—3 or 2 parts vermiculite to 2 parts sand and 1 part cement—will increase strength, provide a different texture, and add weight. Vermiculite, sand, and cement is still a lightweight concrete, because it is the large pebbles and stones in a common mix that contribute to most of the weight.

Ordinary mortar used for brickwork is another good material for fine detail. Just make it into a soupy mixture consisting of cement, sand and water.

Mixing Is Important. All the materials should be thoroughly integrated before water is added. For small projects, you can work in a pan or pail (Fig. 6). For most of the larger projects, a wheelbarrow will do fine.

You can save money by buying the materials in bulk if you plan many projects. A yard of concrete mix—this includes aggregate and sand already mixed, and three or four bags of cement—will get you started. If you want to start off small, buy a 100 lb. bag of prepared concrete or mortar mix that has has all the ingredients already mixed, and just add water.

A Wall Plaque (Fig. 2) is a good project to start with. It can be used as a fence insert, hung on an interior wall, or set in the ground in a garden with lacy plants in front of it.

First step is to make the form base (Fig. 2) from ½-in. plywood, then shape the raised pieces from solid lumber. All sides of the raised pieces are beveled to make removal easy; undercuts won't do, because they would be impossible to remove from a mold of this type. Tack-nail these pieces in place from the back side of the base after rounding off sharp corners with sandpaper. Use ¾-in. box nails to attach the sides.

Set the form on a level surface and wet it with a light sprinkling from a hose. Put six shovels of vermiculite, four shovels of sand, and two shovels of cement in a wheelbarrow and mix thoroughly. Ideally, mixing ends when each particle of sand and vermiculite is coated with the cement. Add water slowly, mixing as you go until the mix is plastic. Too little water is better than too much.

Put the mix into the form with a small trowel, working it in around the blocks and making sure all depressions are filled. If you want a very smooth surface, sprinkle what you've poured very lightly with water and tamp it down. Tapping against the sides of the form will also help. Continue filling the form, tapping against the sides as you go, and finish by using a strip of wood as a strike-board to level off the top. Let it set for at least two days.

Vermiculite Concrete Holds Water longer than a regular mix and needs a longer setting time. After the first day keep the concrete damp by sprinkling water on it. Remove the side pieces on the third day, and turn the project over and remove the base wood on

the fourth day. If the blocks don't come away with the base, drive in some screws and use these as handles to pull the blocks out gently. Set the plaque in a shady place and sprinkle it every day for about 10 days.

The plaques (Figs. 1 and 1B) employ a different type of mold to cast the figures (Fig. 4). Cut the mermaid and marine figures out of ½-in. plywood with a saber saw, then the sides and bottom members to size. When the form is assembled with ½-in. box nails, the concrete base will be 1 in. and the figures raised ½ in.

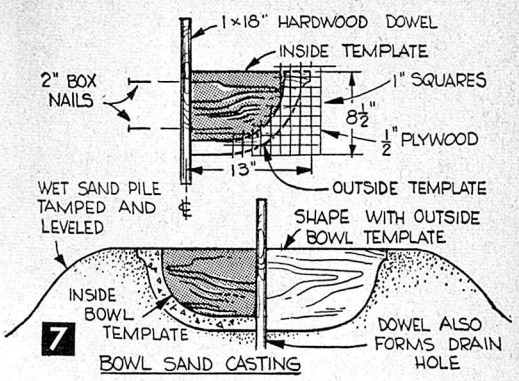
After the cut-outs are made, sand all figure edges, then coat the pattern board with a 50-50 mixture of alcohol and shellac and sand again. When nailing the form together, be sure there are no open spaces. If any exist, fill them in with soap.

Place the form on a level surface and use a 3-2-1 vermiculite mix for the pour. The mermaid plaque (Fig. 4A) requires about nine shovels of vermiculite, six shovels of sand, and three shovels of cement. The marine plaque (Fig. 4B) requires just a little less.

Before pouring, coat all form surfaces with #30 motor oil. Brush it on like paint, and don't let it pool up. Be sure to fill the cavities thoroughly. This concrete mix should be loosely packed, so sprinkle it lightly and tamp the form with the edge of a small trowel. When the form is filled to the top, strike it level. Let it set for two days, then turn it over and remove the sides and backup board (Fig. 3).

After two more days of drying, the wood will begin to pull away from the concrete and you can remove the pattern board to fully expose the finished project.

Planters Are Good Projects for concrete, not only because of appearance but because the concrete helps to retain moisture in the soil. A regular concrete mix—about a cubic foot—was used in Fig 5. Cut the planter mold components to shape and dimension from a



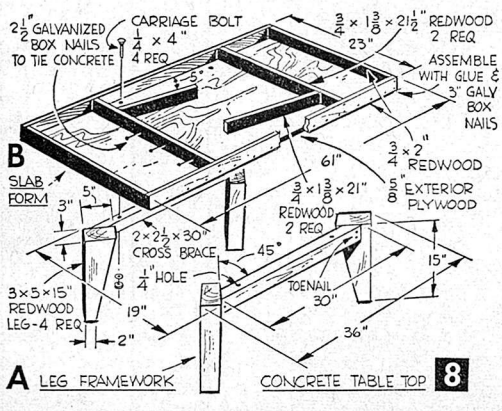
piece of ¾ x 19 x 42½-in. exterior grade plywood, then miter two strips of 1 x 1 x 16½-in. fir. Use 1½-in. box nails to assemble.

Pour about 1½ in. of mix into the form, then set a 1-gal. jug that's painted with oil and into the concrete and finish filling the form. Be sure the jug is centered so concrete can be poured around it. After the filled form sets about 1½ hours, wash the surface with a strong stream of water. This will expose the large aggregate and provide an interesting texture.

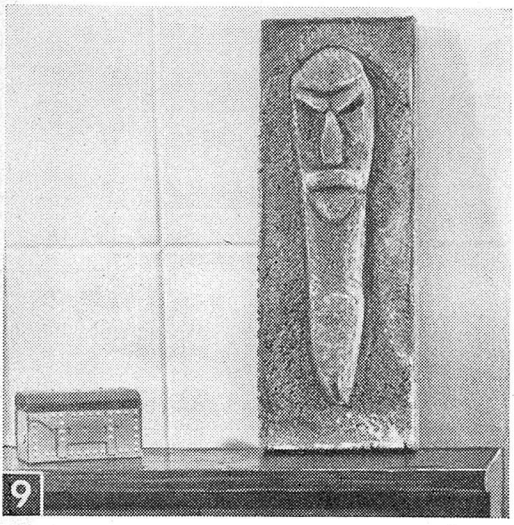
While the concrete is setting, turn the jug occasionally to keep the concrete from adhering. In about 5 hours, remove the jug completely, turning it as you draw it out. Let the planter set at least a day before removing the form sections, then keep it damp and in the shade at least a week before using it.

Round planter bowls (Fig. 1A) can be cast in sand. Make the mold by wetting down a mound as in Fig. 7, then tamp down and level the top. Use the outside template (Fig. 7A) like a compass to remove excess sand as you turn it. If the sand is damp enough, this will produce a perfect shape.

Use a plain mortar mix—five parts sand, one part cement—and enough water to keep



the mix fairly loose. Put the inside template (Fig. 7A) in place and pour small amounts of mix around the base of the dowel pivot as you turn the template. Be sure to keep the center dowel vertical so the bowl sections



Cast in a sand mold using a vermiculite concrete mix, this decorative head can be displayed indoors or in your garden.

will be uniform. Continue pouring the mix along this sides as you turn the dowel until the form is filled. You might have to touch up the top edges by hand after waiting about a half hour. For this touch-up job use a small trowel, dipping it in water as you work.

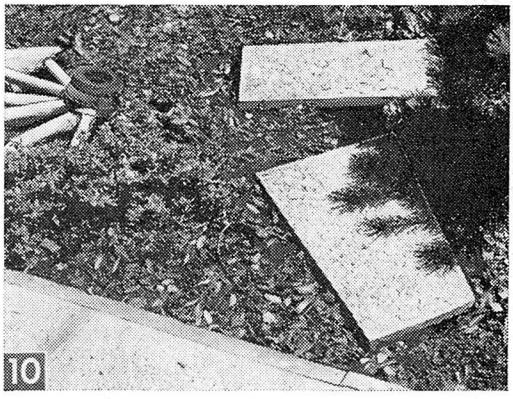
Sand-Casting Odd Shapes such as the face in Fig. 9, requires making an impression with a pattern that you can make or buy. Build a plywood box that is about 4 in. deeper, wider, and longer than the pattern and half fill it with sand. Wet the sand until water starts to stand on the surface, then press the pattern into it. Keep dampening the sand while you work it around the pattern with your fingers to shape it to the contour of the figure. Let the excess water drain off before carefully removing it. Slight irregularities can be fixed by hand.

Make a soupy mix of vermiculite or mortar and pour it slowly into the mold, using a small, rounded stick to be sure the cavity is filled. Finish pouring to the top of the box. After two days, remove the box and wash off the sand. The finer the sand used in the mold, the smoother will be the texture of the completed project.

Stepping stones (Fig. 10) can be cast in any shape. You can make 2-in.-deep wooden boxes, round forms with thin sheet metal or mailing tubes, and even corrugated boxes that you cut off to a 2 in.-depth for the forms. A regular concrete mix can be used, and don't do too much tamping. For an exposed aggregate surface, wash the completed form with a steady stream of water after the concrete has set for about an hour.

Concrete Top Patio Table is an ideal piece of outdoor furniture. Small sample tiles, interesting stones, coins, and shells can be imbedded in the surface to add still more interest.

The complete form (Fig. 8) must be assembled before any concrete is mixed. Since the wood form is not removed and must take the weather, use plenty of waterproof glue and galvanized nails for assembly. Assemble the leg framework (Fig. 8A), drill ¼-in. holes for the carriage bolts in the leg crossbraces, then use these openings as templates to make the holes in the base of the slab form (Fig. 8B).

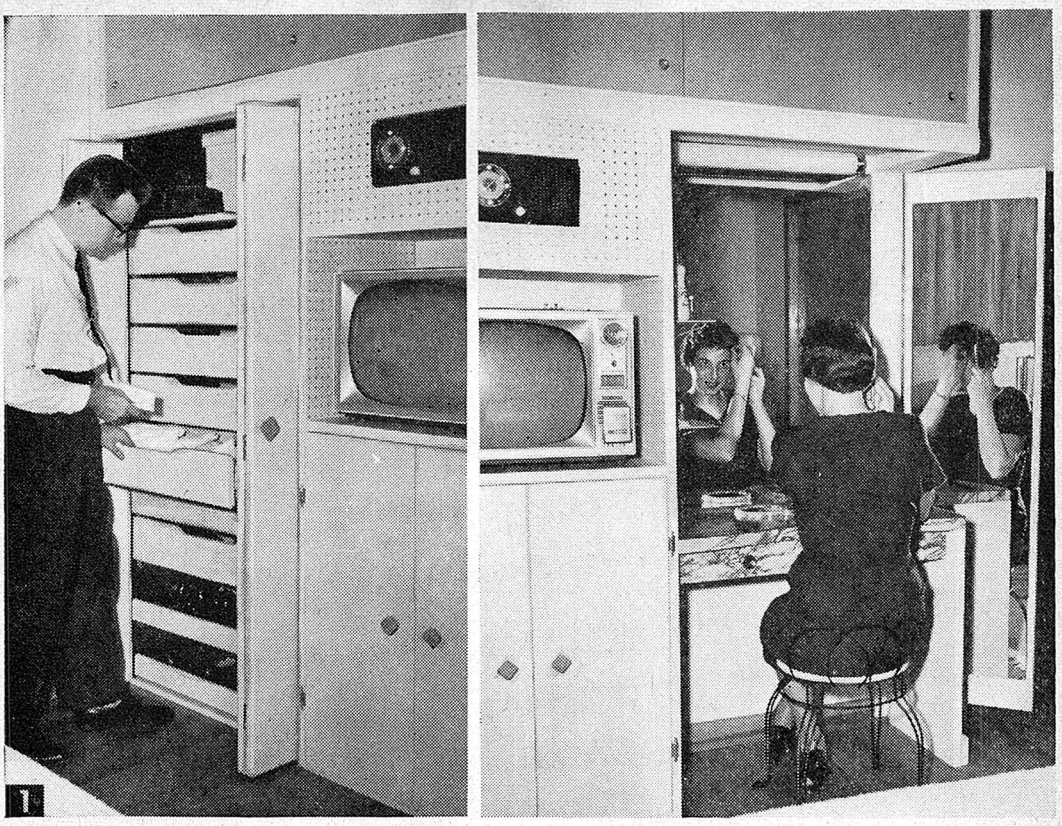


Left-over concrete from other projects can be made into odd shaped stepping stones that are ideal for garden paths.

Be sure to use carriage bolts, because they can always be tightened even though you can't get at the heads. For additional stability drive 3½-in. galvanized box nails through the ¾-in. exterior grade plywood form bottom into the legs after the bolts have been tightened.

Make a mortar mix of 12 shovels of sand to 3 shovels of cement and use just enough water to make a stiff mix. Pour in place and use end of a 2x4 to tamp it down. Strike the slab level and check all corners to be sure there are no holes that will enable the mix to run out. Striking will leave a pebble finish. But if you want something smoother, work over the surface with a steel trowel after it has set for about an hour. Objects should be imbedded immediately after pouring the slab surface.

Keep the slab damp for about a week. There will be some separation between the wooden sides and mortar, but this will not be excessive if you nail the form as in Fig. 8B.



Compact bedroom built-in transforms bare bedroom wall into a handy service area and provides more extras in a limited amount of space than could be obtained with ready-built units.

Wall-Sized Bedroom Built-In

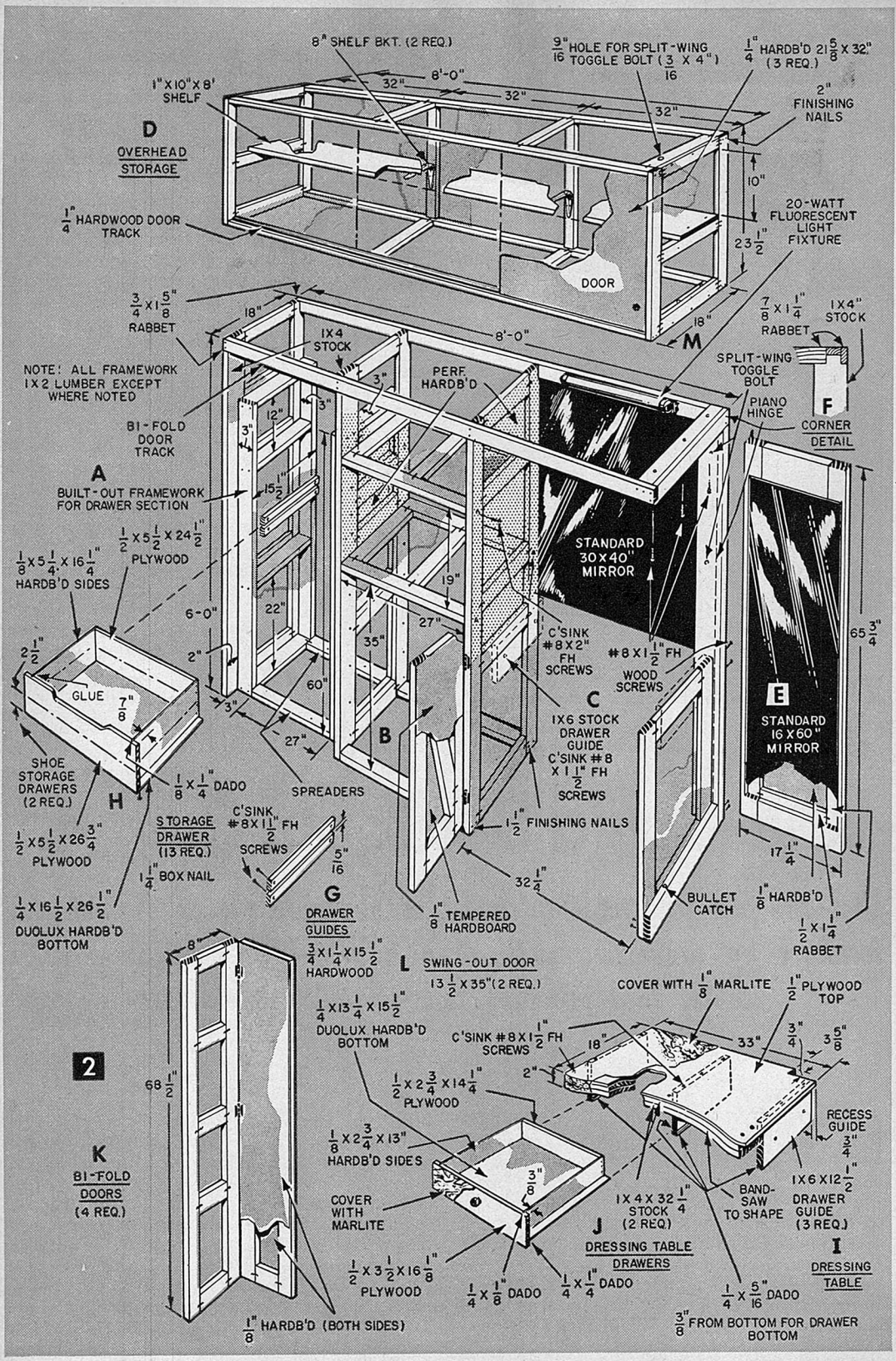
Eliminate the toe-stubbing clutter of separate pieces of bedroom furniture by converting wall area into a multi-purpose service center that provides floor-to-ceiling usefulness

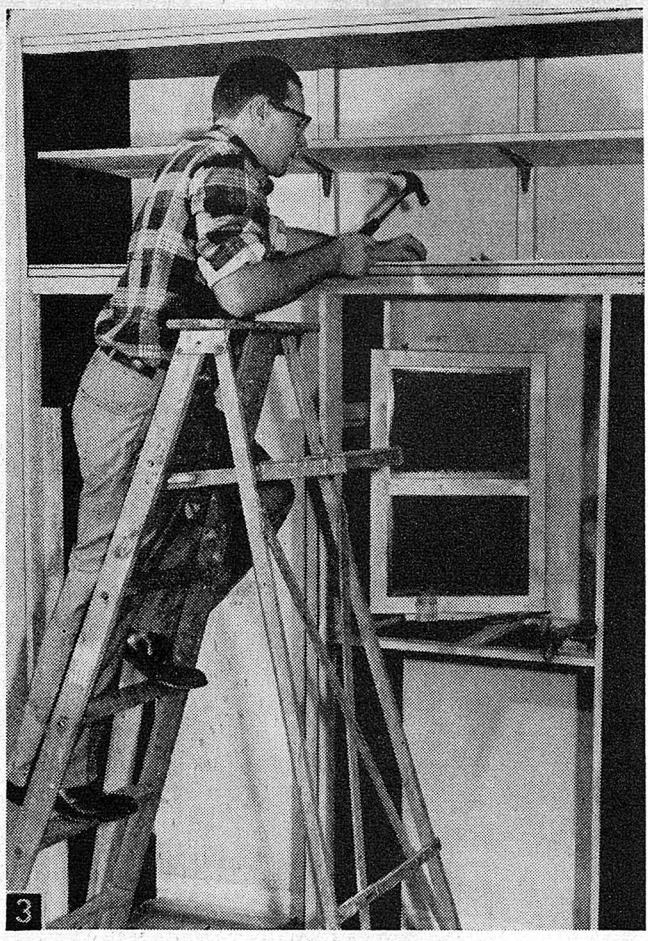
DESIGNED for modern living, this bedroom built-in lets you turn a bare wall into an attractive service center with concealed drawer storage, a TV-radio compartment, mirrored dressing area, and an overhead storage unit with sliding doors.

Although this built-in is dimensioned to fit an 8 x 8-ft. area, 18 in. deep, the cabinet can be made larger or smaller to suit your own requirements, so plan your material purchases accordingly (see Materials List).

Choose a wall area that has an electrical outlet so you have power for the TV and radio and for the 20-watt fluorescent fixture that provides extra light for the mirrored dressing table (Fig. 2C).

First Step in construction is to cut the framing to size (Fig. 2) for the lower cabinet and overhead storage. Basically, all the framework is made from 1 x 2s, the only exceptions being the 1 x 4s used in the facing frame of the drawer storage compartment (Fig. 2A) and the upright that holds the swing-out mirror (Fig. 2F).


8" SHELF BKT. (2 REQ.)
9/16" HOLE FOR SPLIT-WING TOGGLE BOLT (3/16 X 4")
1/4" HARDB'D 21 5/8 X 32" (3 REQ.)
1"X10"X8' SHELF
32"
8'-0"
32"
32"
2" FINISHING NAILS
D
OVERHEAD STORAGE
10"
20-WATT FLUORESCENT LIGHT FIXTURE
1/4" HARDWOOD DOOR TRACK
23 1/2"
DOOR
3/4 X 1 5/8" RABBET
18"
8'-0"
18"
M
7/8 X 1 1/4" RABBET
1X4" STOCK
1X4 STOCK
PERF. HARDB'D
3"
SPLIT-WING TOGGLE BOLT
NOTE! ALL FRAMEWORK 1X2 LUMBER EXCEPT WHERE NOTED
PIANO HINGE
F
CORNER DETAIL
81-FOLD DOOR TRACK
12"
3"
3"
A
BUILT-OUT FRAMEWORK FOR DRAWER SECTION
15 1/2"
STANDARD 30X40" MIRROR
1/2 X 5 1/2 X 24 1/2" PLYWOOD
1/8 X 5 1/4 X 16 1/4" HARDB'D SIDES
19"
6'-0"
22"
27"
65 3/4"
2 1/2"
2"
35"
C'SINK #8X2" FH SCREWS
#8 X 1 1/2" FH WOOD SCREWS
C
1X6 STOCK DRAWER GUIDE
C'SINK #8 X 1 1/2" FH SCREWS
E
STANDARD 16 X 60" MIRROR
GLUE
7/8"
60"
3"
27"
B
SHOE STORAGE DRAWERS (2 REQ.)
H
1/8 X 1/4" DADO
SPREADERS
1 1/2" FINISHING NAILS
17 1/4"
STORAGE DRAWER (13 REQ.)
C'SINK #8X1 1/2" FH SCREWS
5/16"
1 1/4" BOX NAIL
1/2 X 5 1/2 X 26 3/4" PLYWOOD
32 1/4"
BULLET CATCH
1/8" HARDB'D
1/4 X 16 1/2 X 26 1/2" DUOLUX HARDB'D BOTTOM
1/8" TEMPERED HARDBOARD
1/2 X 1 1/4" RABBET
G
DRAWER GUIDES
3/4 X 1 1/4 X 15 1/2" HARDWOOD
L
SWING-OUT DOOR
13 1/2 X 35" (2 REQ.)
COVER WITH 1/8" MARLITE
1/2" PLYWOOD TOP
1/4 X 13 1/4 X 15 1/2" DUOLUX HARDB'D BOTTOM
C'SINK #8 X 1 1/2" FH SCREWS
18"
33"
3/4"
3 5/8"
2
2"
1/2 X 2 3/4 X 14 1/4" PLYWOOD
68 1/2"
RECESS GUIDE 3/4"
1/8 X 2 3/4 X 13" HARDB'D SIDES
3/8"
K
81-FOLD DOORS (4 REQ.)
COVER WITH MARLITE
1X4 X 32 1/4" STOCK (2 REQ.)
BAND-SAW TO SHAPE
1X6 X 12 1/2" DRAWER GUIDE (3 REQ.)
J
DRESSING TABLE DRAWERS
I
DRESSING TABLE
1/2 X 3 1/2 X 16 1/8" PLYWOOD
1/4 X 1/8" DADO
1/4 X 1/4" DADO
1/4 X 5/16" DADO
3/8" FROM BOTTOM FOR DRAWER BOTTOM
1/8" HARDB'D (BOTH SIDES)



Attach ¼ in. hardwood door track for the sliding doors after nailing hardboard to the top, bottom, and sides of the top storage unit.

MATERIALS LIST—BEDROOM BUILT-IN

No. Req.	Size and Description	Use
37	1 x 2″ x 8′ fir or pine	framework
5	1 x 4″ x 10′ fir or pine	framework
1	1 x 6 x 40″ fir or pine	drawer guides
6	1 x 6 x 48″ hardwood	storage drawer guides
1	1 x 10″ x 8′ pine	overhead storage shelf
6	⅛″ x 4 x 8′ tempered hardboard	cover framework, drawer sides, doors
1	⅛″ x 4 x 6′ perforated hardboard	TV radio, dressing table, compartments
3	¼″ x 4 x 8′ Duolux tempered hardboard	drawer bottoms
1	½″ x 4 x 8′ fir plywood	drawer fronts, backs
1	½ x 33½ x 18″ plywood	table top
1	⅛ x 20¼ x 48″ Marlite Panel	table top, drawer fronts
1	¼ x 95½″ hardwood door track	sliding doors
1	21″ bi-fold door track	
1	16 x 60″ mirror	swing-out frame
1	30 x 40″ mirror	wall mirror
1 bx.	¾″ brads	hardboard
2 bxs.	corrugated fasteners	framework
½ lb.	2″ finishing nails	framework
¾ lb.	1″ common nails	drawers
32	#8 x 1½″ fh wood screws	table top, corner support TV-radio shelves
4	Split-wing toggle bolts	dressing table frame, corner-to-ceiling support
Misc.	folding door hardware, butt hinges, contact cement, fluorescent fixture, piano hinge, molding, etc.	

After the frame material is cut, rabbet the upper corners of the uprights and the top part of the 1 x 4 as in Fig. 2F. When completed assemble the frame components with corrugated fasteners.

Make the built-out framework for the storage drawers (Fig. 2A) by cutting 1 x 4s to 3-in. widths and attach with countersunk, 1½-in. finishing nails. When assembled, lay the cabinet frame on the drawer framework so the back and bottom are flush and the drawer section is recessed 2½-in. from the front edge of the 1 x 4 frame uprights. This recess is required so the bi-fold doors (Fig. 2K) can be opened without interfering with the storage drawers.

Several Alternatives are available if you do not want to devote space to TV and radio as in Fig. 2B. You can eliminate the two shelves and make this into one drawer storage area. Or you can make one shelf and use this space to keep plastic storage boxes to hold sweaters and other woolen garments. If used for storage, make another set of doors (Fig. 2L).

Next step is to cut and assemble the components for the dressing table (Figs. 2I and J). Start by covering both sides of the 17¾ x 30-in. frame (Fig. 2C) with hardboard. Install the bullet catch in the 1 x 2 mirror stop and nail it to the frame.

Build a lip on the front edge of the ½ x 18 x 34½-in. plywood table top (Fig. 2I) by first laminating two 1 x 4s with contact cement, then drill ⅛-in. guide holes and attach the 1 x 4s to the top with No. 8 x 1½-in. flathead screws. Bandsaw the table front to shape and rabbet the right rear corner.

Cut the dressing table drawer guides (Fig. 2I & J) from a 1 x 6 and dado so the drawer bottoms fit into the grooves and become part of the drawer slide. Drill ⅛-in. guide holes through the top and screw the drawer guides to it. Cut ⅛-in. *Marlite* for the top, and 2-in. strips for the front and side. Apply contact cement and glue the top and front in place.

Make the swing-out mirror frame as in Fig. 2E, or flush mount the mirror on ½ x 17¾ x 65¾-in. plywood. To build the frame,

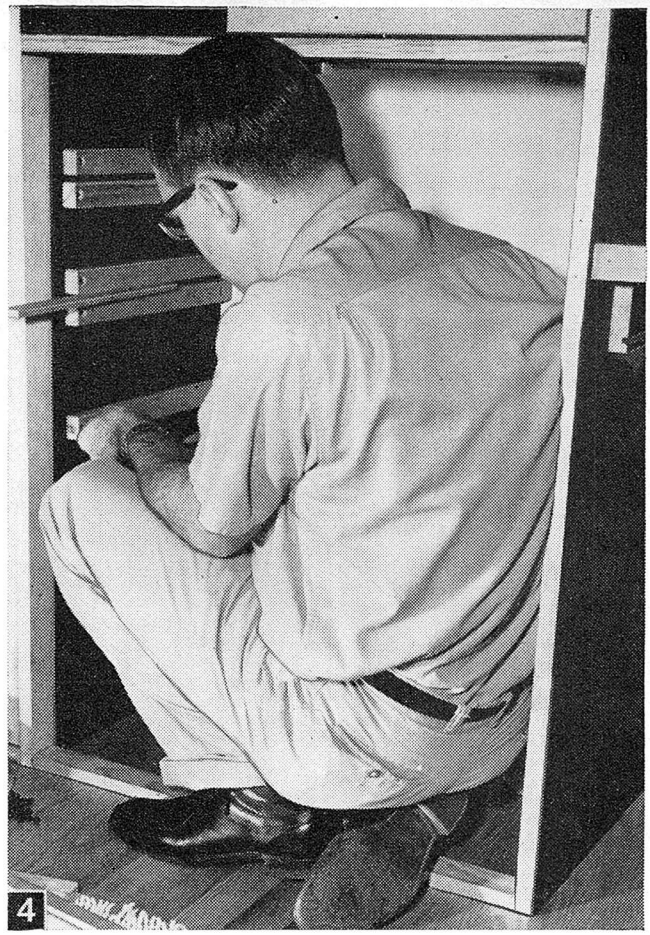
make ½ x 1¼-in. rabbet cuts on the inside edge of the framing. Use corrugated fasteners to hold the butt joints, square off the corners, and nail hardboard to the back of the frame with brads. Slip the mirror in the rabbet and hold with cove molding.

Storage Drawers (Fig. 2H) are bottomed with ¼-in. *Duolux* hardboard that is smooth on both sides so the drawers can slide freely in the hardwood guides (Fig. 2G). Cut the drawer fronts and backs out of ½-in. plywood, and the sides from ⅛-in. hardboard. Dado all grooves and cut all rabbets in the fronts as indicated in Fig. 2H, and shape the fronts.

Dressing table drawers (Fig. 2J) are dadoed so the front extends ½-in. below the drawer bottom, and the sides are positioned so the front covers the side drawer and conceals half of the center guide.

Door framework (Fig. 2K & L) is made of 1 x 2s whose butt joints are held with corrugated fasteners. The entire frame is covered on both sides with ⅛-in. hardboard. Attach the hardware and the doors are ready for hanging.

To Assemble the Unit, lay the frame partitions face down and have someone hold them in position when you attach the rear crosspiece into the rabbets with 1½-in. finishing nails. Set the framework upright and against the wall, then nail the front crosspiece in place. Nail the 27-in. spreaders between the frames as in Figs. 2A and B. Use a nail set so you won't take a chance on marring the wood surface.



Space the drawer guides so there is a ½ in. opening between the drawer fronts, and use a piece of drawer bottom material as a guide to measure the opening between runners.

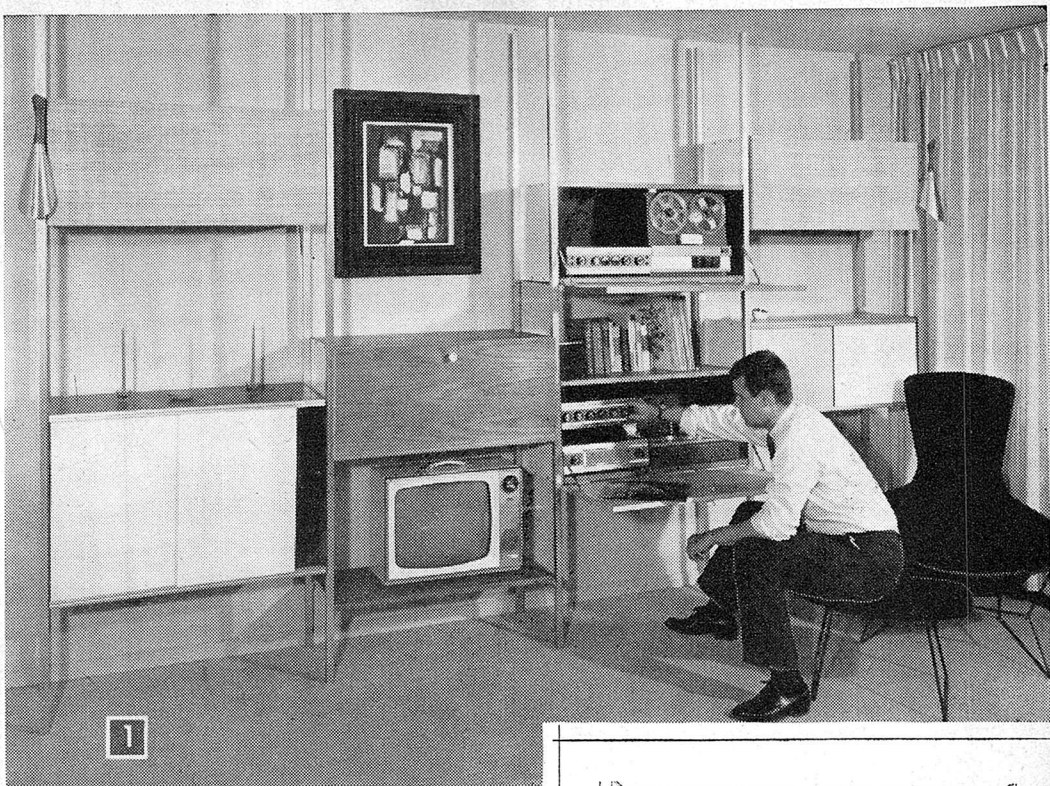
Attach the dressing table frame to the wall with split-wing toggle bolts as in Fig. 2C, or use No. 16 x 3-in. *fh* screws if you are sure of hitting the stud. Then nail the corner 1 x 2s to the front crosspiece and into the rabbets of the 1 x 4.

Overhead Storage Compartment (Fig. 2D) can be assembled separate and slipped into place because ½-in. was allowed for clearance. Use finishing nails to attach the sides to the top and bottom, and to install the spreaders in the back. Cover the bottom and back with hardboard and attach the shelf brackets with screws. Cut openings in the hardboard sides so the shelf can be nailed to the side frames. Cover the exposed frame on the right side with hardboard and install the sliding door track.

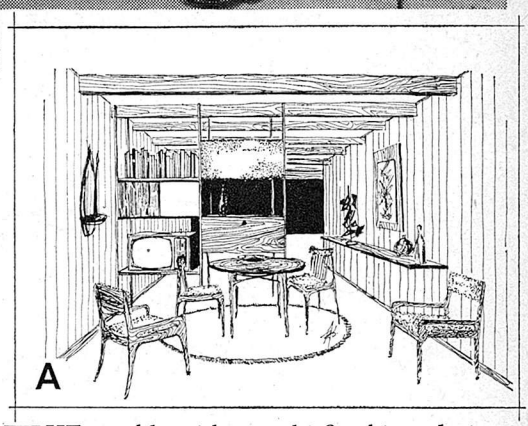
Drive shims between the ceiling and storage unit for a snug fit, then nail the top piece of hardboard in the unit. To prevent the right corner from bowing, attach the cabinet corner to the overhead storage unit as in Fig. 2M, and install the toggle bolt.

When Cutting the Hardboard to finish off the cabinet (Fig. 2), lay out the dimensions on the ⅛-in., 4 x 8-ft. sheets with an eye to minimum waste. Take the measurements from the work to give you an exact fit in case there are any deviations in the framing, and use a fine-tooth saw blade to cut both the tempered and perforated hardboard to size. Use brads to hold the hardboard in place, and sand smooth the exposed edges. Cut three ⅛ x 32 x 21⅝-in. hardboard door panels to fit into the door track in the overhead storage unit.

Finish off your bedroom built-in by installing ranch stop molding where the cabinet and overhead storage meet and use ¼-in. round where the unit butts against the walls and ceiling.



Stereo speakers are mounted in the two baffles at the top left and right. Installation has extra space for future additions, is easy to move, and does not mar walls, ceiling or rug. Room divider (A) is alternate design.



Modular Home
Entertainment Center

With pre-cut material, an apartment dweller can assemble this ultra-modern hi-fi wall, using only a drill, 6-ft. rule, and screwdriver

By BOB SRODON

Designer, Masonite Corporation

THE trouble with most hi-fi cabinet designs has been that you had to have a complete power workshop to build the project. And, though it has been done, it sometimes is hard to fit a full size table saw, sander, and jointer into a modern apartment or ranch house.

This up-to-the-minute design that has the styling and eye appeal of $500 custom installations has been worked out jointly by hi-fi experts of Allied Radio Corp. and Masonite Corp. You can put the unit together with common hand tools, and it is a beautiful addition to any home or apartment. To ease the strain on the pocketbook, you can start out with one section and add the rest later.

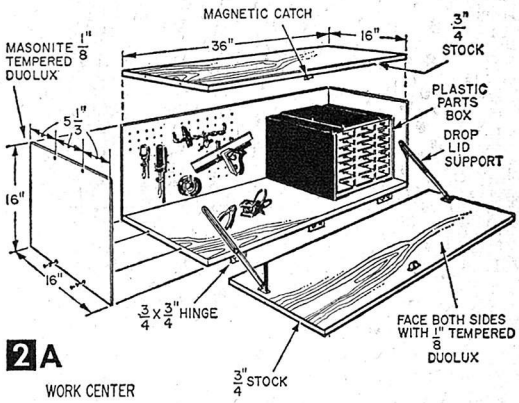
Every part of the entertainment center has been tested and proven in working installations. Working only with the plans, a 6-ft. rule, a ¼-in. electric drill, and screwdriver,

the author and a helper were able to erect the unit shown (Fig. 1) in one busy 5-hour work spree. Wood and *Masonite* parts can be ordered from local lumber yards cut to exact size or, if you prefer to do your own, can be sawn on a new portable power table saw that was also tested on the project (Fig. 5).

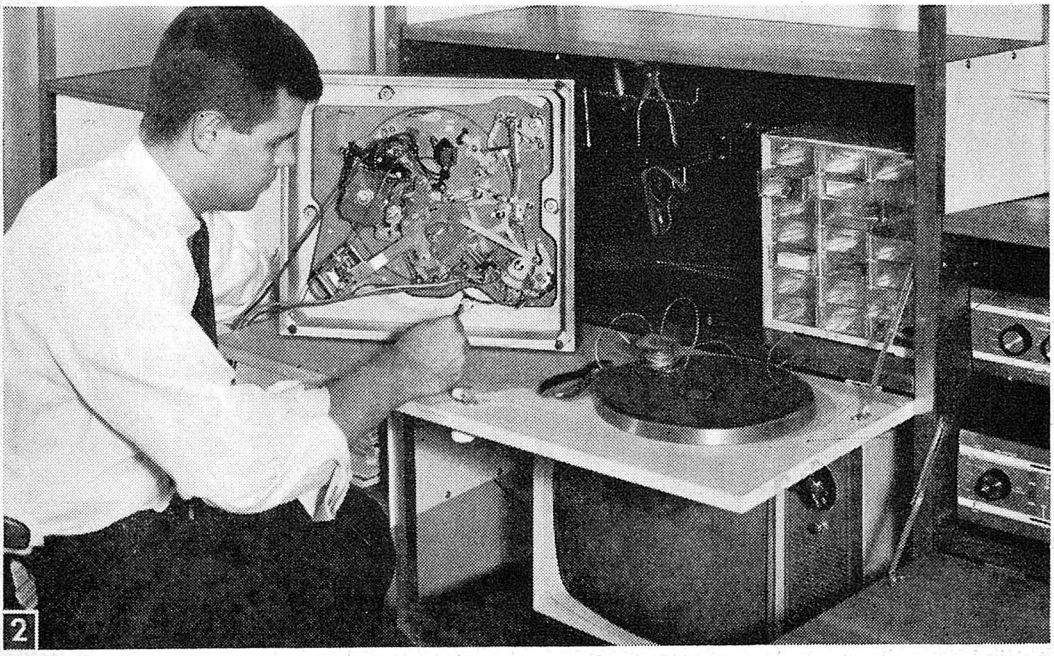
This is a modular design; parts are interchangeable and dimensions are proportional to one another. The basic 1x3-ft. module is a rectangular shape that pleases the eye and fits well with not only contemporary modern, but with most other styles of furniture, too. The complete four-section stereo unit (Fig. 1) fits in a 12x15 ft. living room. In a smaller room, the end sections can be used separately on opposite walls. In long rectangular rooms, or duplex living rooms, the room divider design (Fig. 1A) makes an effective separation of living areas.

The basic design (Fig. 1) houses a tape deck, pre-amp, amplifier, tuner, turntable, TV set, stereo speakers, plus 200 LP records and a tape library. There is ample room for at least a hundred books and a tool-work desk gives you a space for light hobby work and for assembly and testing of electronic kits.

Start Your Installation by making a list of all your hi-fi equipment. Use a soft pencil and wrapping paper to draw up full size front view patterns of the equipment enclosures. Check to be sure that you have ample space for all control knobs, wiring, and connections. The next step is to order the aluminum poles. Manufactured especially for this project by Midland Metal Products, the 10-ft.-long, 1-in.-square aluminum poles are treated with a scratch and stain resistant brass satin finish that will not oxidize. The poles can be purchased (see Materials List) in the standard 10-ft. lengths, or in 7- and 8-ft. lengths. The ceiling adjuster will take care of a 2-in. ceiling slope, so if your ceiling happens to be 9 ft. 3 in. high, plan to saw 10 in. off the 10-ft. pole. Be sure to measure at each point on the ceiling where the poles will be installed. There is no need to allow for a carpet coaster if you have a soft nap rug. The installation shown in Fig. 1 was moved several times after initial setup, and though the poles had been in place for months, the hollow square pole section did not damage the rug. On wood, hard rugs, or linoleum floors, use rubber or felt pads



2A WORK CENTER



Author Srodon installed work center cabinet 29 inches above floor for convenience in assembling kits and servicing equipment. Ham station could be enclosed in similar module.

Peg board shelf brackets support tuner and amplifier. Bracket spring action cushions tubes against vibration. Hi-fi components shown are Allied Radio Knight-Kits.

under each pole.

Obtain the ⅛-in. Masonite tempered Duolux and Pegboard at your local lumber yard. You can order the panels cut to exact size, if your dealer is equipped with panel-cutting equipment. Be sure to explain that you want dead square, clean cut pieces. If the lumber yard is not set up with the proper equipment, order the pieces ⅛ in. oversize to allow for edging with a sanding block.

For the tops and bottoms of each cabinet (Fig. 4), you will need ¾-in. wood. Finished pine will serve the purpose, or you may be able to purchase the stock in veneered hardwood grains. Another source would be salvaged hardwood from discarded furniture, often available in used furniture shops.

Assemble the Cabinets by screwing the side panels to the top and bottom pieces with #6x1½-in. chrome plated wood screws and chrome plated countersunk washers located on 6-in. centers as in Fig. 4. It would be best to use clamps and square wood blocks to guarantee square accurate corners. Next fasten the peg board to the cabinet backs with the same size screws and washers. Rather than risk poor fitting holes, it is best to buy the right size of screw-hole drill.

Next add the speaker face, drop lid doors, and sliding doors. Detailed information on these steps is provided in Masonite Project Plan AE-382 (see Materials List).

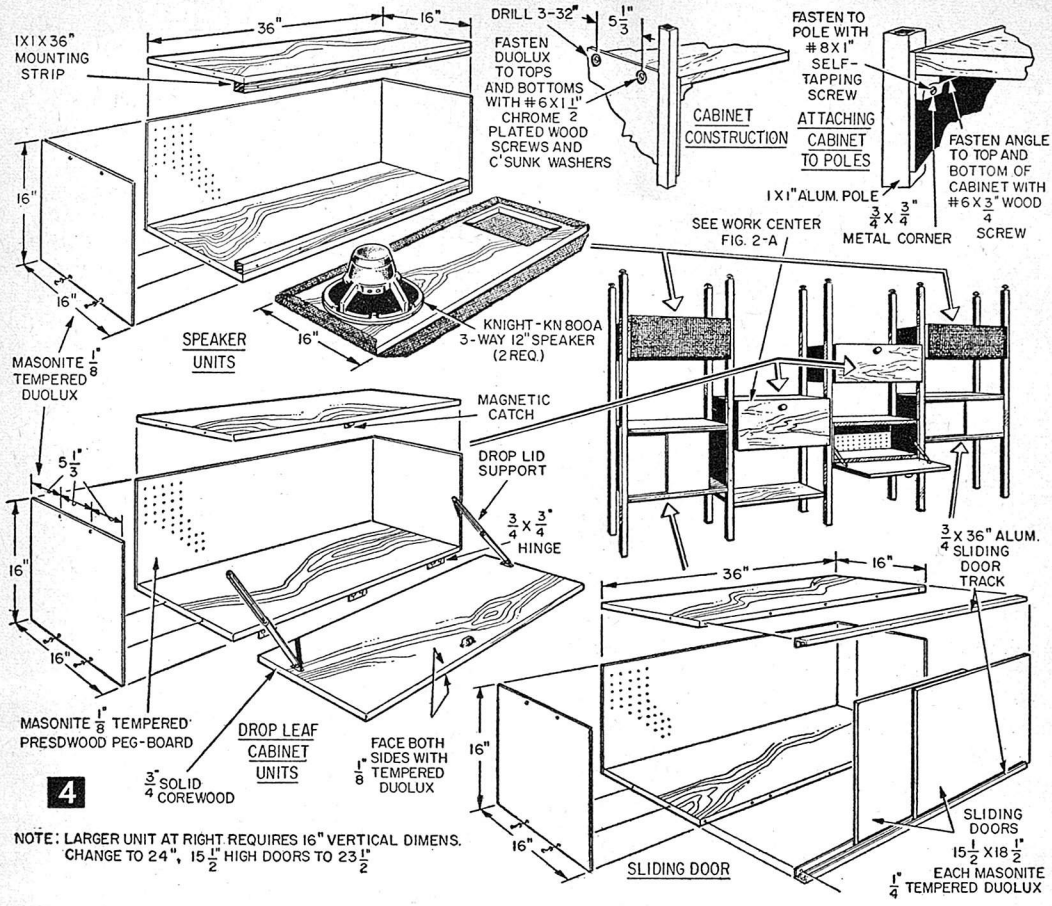
As soon as one cabinet is finished, you can start the pole assembly. It is important to locate the poles dead vertical to the floor. Use a large carpenter's square or the edge of a square carton to check. Now for an example, let's install the storage section on the far left side (Fig. 1). The cabinet fastens to the four poles from the inside with self-tapping sheet metal screws. Measuring carefully, drill holes in each pole exactly the same height up from the floor. Use a center punch or sharp

MATERIALS LIST—HOME ENTERTAINMENT CENTER

NOTE: This list applies to the four-section unit as shown. Plans can be altered to fit larger and smaller rooms. You can design your own units based on one, two, or three sections, ordering fewer parts as required. But it is recommended that you *do not* change the basic unit sizes, because this may affect the balance and eye appeal of the design.

Amt. Req'd.	Size and Description	Use
10	1"-square etched aluminum poles. Anodized and guaranteed not to fade or discolor. Available in natural aluminum or brass finish in 7, 8, or 10-ft lengths with 2" manual adjustment and pads for floor and ceiling. $5.20 per pole, plus shipping, from Midland Metal Products, Vicksburg, Mich. Minimum order, 4 poles	vertical support
	Alternate—Aluminum poles as above in same size and finish with pads, but with built-in spring loaded tension device which eliminates hand tightening. $7.25 each. Minimum order, 4 poles	vertical supports
4	36" sliding door tracks, ¾ x ⅞" with ¼" slot. L. A. Darling Co. or equal. Cost $1.50 at hardware stores and lumber yards.	panel slides
60	1 x 1" metal corners, Stanley #996½ or equal	cabinet supports
9	¾ x ¾" cabinet hinges with screws	panel hinges
6	8" drop lid supports	panel mtg.
3	magnetic catches	drop panels
154	#6 x 1½" chrome plated slotted wood screws with #6 chrome plated countersunk washers	side to top and bottom fastenings
60	1" #8 self-tapping chrome plated screws	fastening cabinets to poles
12 pcs.	⅛ x 16 x 16" Masonite tempered Duolux	side panels
6 pcs.	⅛ x 16 x 24" Masonite tempered Duolux	side panels for large cabinets
2 pcs.	¼ x 18½ x 23½" Masonite tempered Duolux	sliding doors
1	⅛ x 24 x 36" Masonite tempered Presdwood pegboard	back panel for large cabinet
2 pcs.	¼ x 15½ x 18½" Masonite tempered Duolux	sliding doors for small cabinet
6 pcs.	⅛ x 16 x 36" Masonite tempered Duolux	for facing cabinet doors
15 pcs.	¾ x 16 x 36" solid wood stock	shelves, tops, bottoms of cabinets
2 pcs.	¾ x 16 x 36" solid wood stock	speaker baffle plates
2	1 x 1 x 36" wood mtg. strips	attaching baffle plates to speaker cabinet
1¼ yds.	speaker cloth	
2	swivel mtg. decorator lamps, spun metal similar to type shown in photos, available by special arrangement, Roto Electric Co., 1914 N. Milwaukee, Chicago 47. $4.95 post paid	lamps
Misc.	knobs, Pegboard shelf brackets, for Hi-Fi components, Pegboard fittings for tool rack, sealer, wood stain, laquer or enamel	

NOTE: For free plans, write Masonite Home Planning Service, 29 North Wacker Drive, Chicago 6. For latest information on sound installations write Hi-Fi Department, Allied Radio, 100 N. Western, Chicago 80.



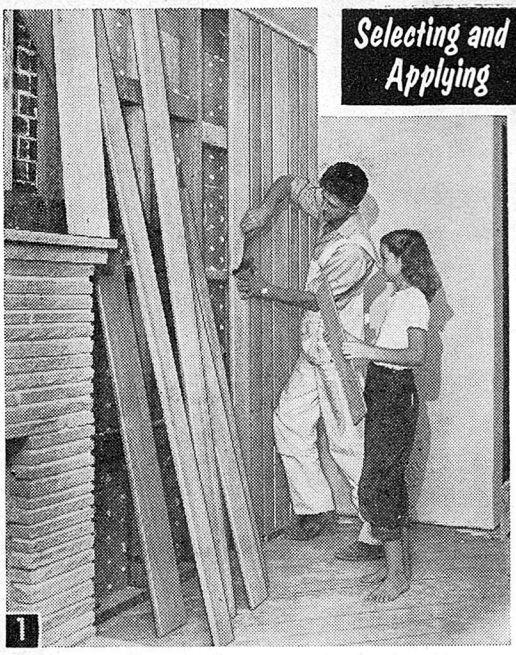
pointed tool to mark the hole and drill dead center on the 1-in. aluminum. Now install metal corners (see Materials List) *on the inside* of the cabinet, feeding the 1-in. #8 size sheet metal screws through the corners and Masonite and into the aluminum. The screws will cut their own thread, and provided that you stick to the right size drill, will hold cabinet weight up to a hundred pounds or more.

To make installation easier, especially if you are working alone, you may want to make temporary cabinet holding spacers of scrap 1 x 2-in. stock. Cut to exact length, they will help you locate the cabinets in the right spot while you install the screws.

Finish colors are a matter of individual choice and matching to decor and furniture already in your room. You can finish the Masonite door panels in bright accent colors, using enamel or lacquer and proper primer or undercoat. Follow your paint dealer's recommendations. To prevent warpage from uneven moisture absorption, always finish both sides of a Masonite panel with the same kind of paint or lacquer. Speaker extension lines and connections between the hi-fi units can be run through the aluminum poles. Power lines should not be installed in the poles unless you pay particular attention to shorting hazards such as sharp corners and tight bends. If you wire your ac lines within the poles, use the best grade of cable, with grommets and strain reliefs at point of entry.

Manufacturer of new 8-in. portable table saw is American Machine and Tool Co., and price including motor is under $50. Saw produces close cuts on panels.

Selecting and Applying WALL COVERINGS



Random width and length, solid-board paneling is installed directly to rough framing for new construction.

Wood and fiberglass panelings are more attractive than ever, and can be easily applied by the homeowner

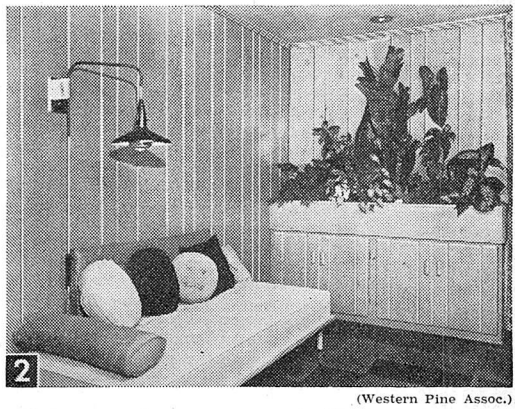
By MILT EVANS

HOW TO PANEL WITH WOOD

IN THE attractive array of solid-wood planking, textured plywood panels and handsome veneers, gleaming sheet plastics, and linoleum-like pliables, table A (pp. 66-67), there is a product to suit every taste, pocketbook, skill and tool that the home craftsman possesses. If you are in a hurry to make use of a room, prefinished wall coverings are available; but if it's a case of getting the most for cash expended, you can choose from numerous unfinished materials to give masonry basement walls and cracked plaster walls a new look. For new construction wood paneling eliminates plastering costs (Fig. 1).

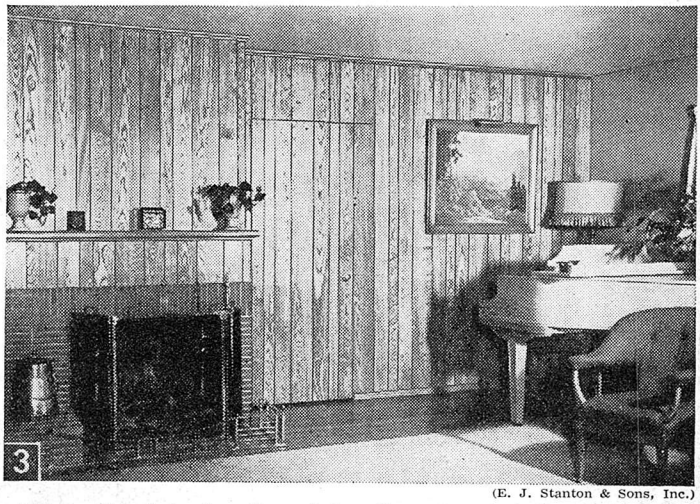
Solid-wood paneling. This material offers an infinite variety of grain patterns, from the simplicity of plain pine (Fig. 2) to the elegance of polished hardwoods (Fig. 3). In addition, age increases the beauty of natural wood and it is an effective insulator against heat and noise. Besides the interior types of tongue-and-grooved boards, some exterior forms can also be used. Even beveled siding is finding a place on one wall of a room for contrast with plaster or wallpaper on the other walls. Interior planking varies in thickness from ⅜ to ¾ in.; widths vary from 4 to 8 in.; lengths from 3 to 8 ft.

Consider all aspects of a room before ordering material. If you want to subdue a wall, use boards of equal width; accent it by the use of



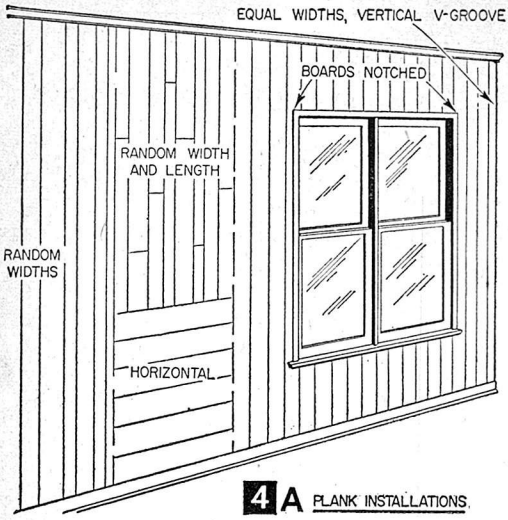
(Western Pine Assoc.)

Modern as today's newspaper is this knotty western pine room with its custom-styled furniture. Knots were subdued in the finishing and a light tan effect achieved to give a harmonizing background for the furniture.



(E. J. Stanton & Sons, Inc.)

Highly-polished, hardwood paneled wall covers one wall of this living room. Door is covered with wall boards and no casings used.

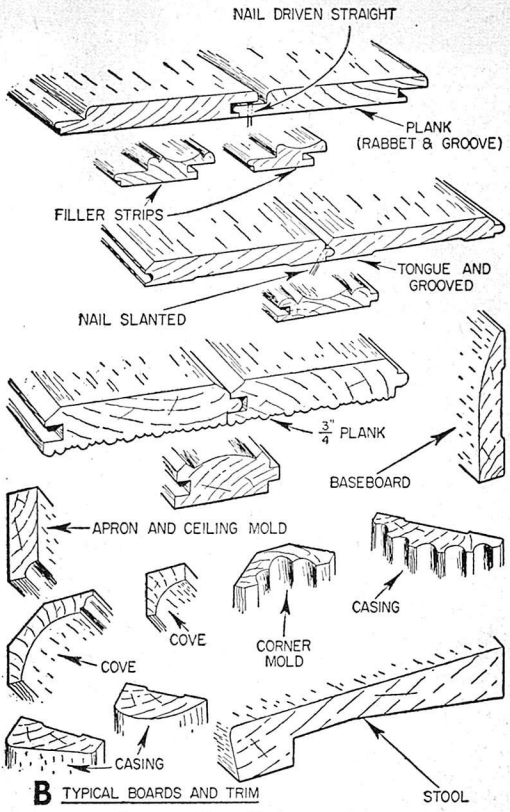


4A PLANK INSTALLATIONS.

random widths. Three different widths laid in rotation create a feeling of movement, while hit-and-miss increases it. Random lengths can be laid with all joints aligned; joints of similar widths aligned, or all carefully staggered. It can be applied horizontally, vertically, or in combined directions (Fig. 4A).

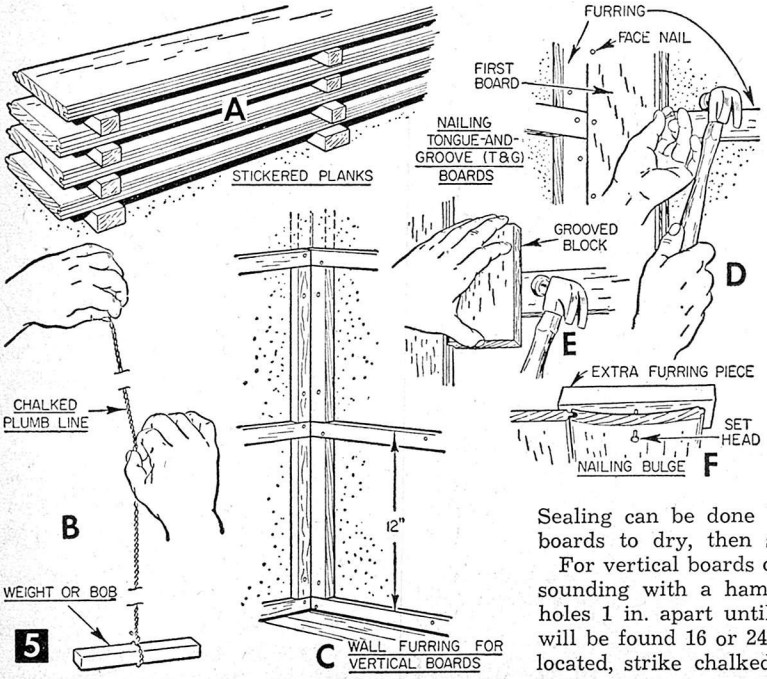
Estimate material needed according to net laying width without deducting for small window openings, and allow 5% for waste.

Solid wood is subject to shrinkage and swelling, even though kiln-dried. If delivered on the job several days before installing, sticker-pile boards with narrow strips separating them as in



B TYPICAL BOARDS AND TRIM

Fig. 5A. The wood will soon absorb the same moisture content as in the air of the room, with less likelihood of dimension changes after being installed. Swelling might move end boards considerably, buckling them against adjacent walls, so it is better if they are slightly damper than the room, as they will then shrink a trifle after installation. Such moisture conditioning pertains to a room normally heated, ventilated, and plaster thoroughly dry.

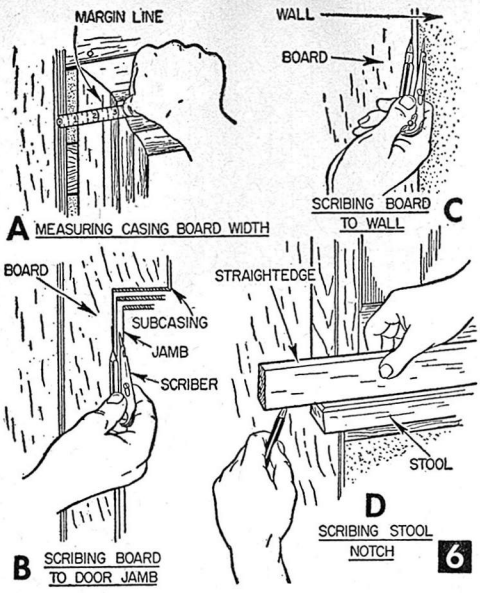


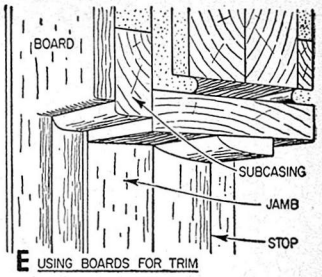
If stickering isn't practical seal the backs and edges of boards with lacquer or a material such as white *Rez*, also the faces if they are not to be stained or bleached. Sealing can be done before installing, allowing boards to dry, then sealing faces afterward.

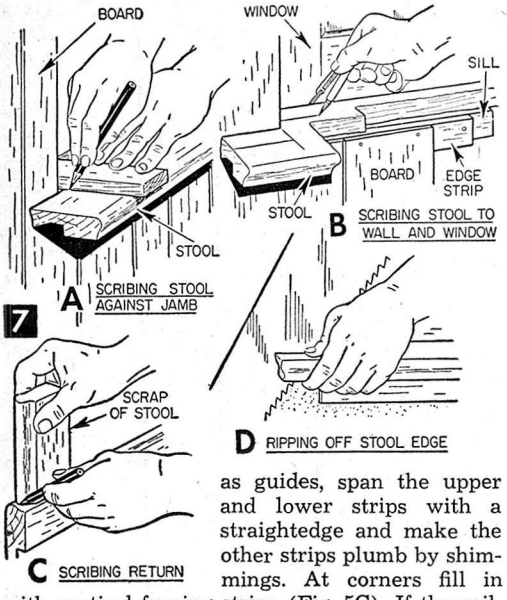
For vertical boards over plaster, find a stud by sounding with a hammer, or by drilling small holes 1 in. apart until a stud is located; others will be found 16 or 24 in. apart. When studs are located, strike chalked plumb lines to guide in

nailing (Fig. 5B), and fasten 1 x 3-in. wooden furring strips to wall with staggered 8d box nails, one to a stud (Fig. 5C).

Locate bottom furring strips so that bottom ends of wall paneling will overlap strips. Space the others 1 ft. apart on centers, and the top strip about 1 in. from the ceiling. Check top and bottom strips with a straightedge and shim out, if necessary, with pieces of shingle to align strips plumb. Then, using these as guides, span the upper and lower strips with a straightedge and make the other strips plumb by shimmings. At corners fill in with vertical furring strips (Fig. 5C). If the ceiling is to be boarded, do it before covering the walls, and seal the boards before installing. Although it is best to use furring strips over old plaster or ceiling material, wooden panels can be installed directly to joists, shimming boards if necessary.







Some random-length boards, when packaged, are intended to be installed as taken out, the lengths adding up to 8 ft. Try to arrange boards to notch around edges of doors and windows, rather than having a joint at an edge. You can cover inside-corner joints with a molding or fit the boards together, eliminating the molding for better appearance. If the latter, remove any edge rabbet, starting with the full thickness of the board.

If you are right-handed, start at a left corner, face-nailing the starting edge where butting board on other wall will cover the heads, using 3 or 4d finish nails about 6 in. apart (Fig. 5D and table B). Resulting rigidity causes board to shrink from the tongue edge. If troubled with the boards splitting, drill holes for the nails or clip off the nail points. Nail plain T & G (tongue and groove) boards at an angle at juncture of tongue and boards. Nail boards with broad rabbets square in, because lapping flange of the next board will cover nail heads (Fig. 4B). Nail succeeding boards at tongue edge only, joining boards with hand pressure, which allows for slight swelling without buckling. If driving is necessary to draw up a sprung board, use a piece of grooved waste (Fig. 5E), but discard sprung or warped pieces. Slightly-cupped boards will usually draw flat when nailed at their centers (Fig. 5F), but extra-short furring strips can be inserted between the regulars where extra nailing is necessary.

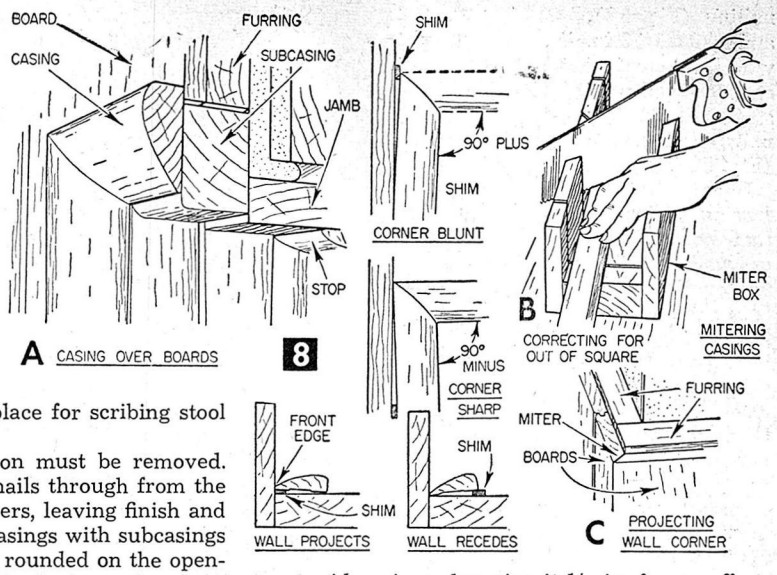
Remove covers from wall outlets and switches and fit boards to box size, either by notching the edges or by boring holes and cutting out with a keyhole saw. Advance receptacles flush with board surfaces by replacing holding screws with longer ones, slipping pieces of electrician's loom behind as backing. Cut loom long enough to compress as screws are tightened.

Thickening of walls because of furring and boards raises a problem with the door and window trim. If casings are flat and the same thickness as furring, place the boards over the casings to the edge of the roll. Gage margin lines on casings and measure from shoulder of last board (Fig. 6A) to this line at top and bottom to get measurements for the lapping board.

At a door, mark the top of the notch, lay out the width, and rip board. If jamb is crooked, transfer the irregularity to the board with scribers or a compass (Fig. 6B). Use a smoothing plane to correct edge. Round the edge of the board or sand off the sharp arris and nail in place, face-nailing into casing. Fill in above the door and fit other side, proceeding from there

with the wall. If the last board butts against a wall not to be boarded, scribe it to fit (Fig. 6C), or hide joint with a molding.

Boards around a window having a stool that is not to be removed require fitting at that point also. Tack the piece at the ends and mark the top and bottom cuts for the stool with a straightedge resting on it (Fig. 6D). Saw the sides of the notch and slip it into place for scribing stool end.



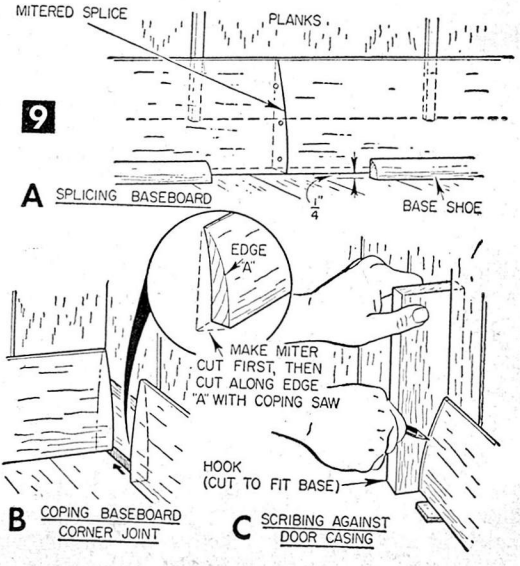
Usually casings and apron must be removed. To salvage moldings, pull nails through from the back with end-cutting nippers, leaving finish and putty intact. Replace old casings with subcasings made from 1 by 2-in. stock rounded on the opening arrises, setting them back from the jamb edges ⅛ to ¼ in. Then, carry the boards over these (Fig. 6E), and under stool, eliminating apron.

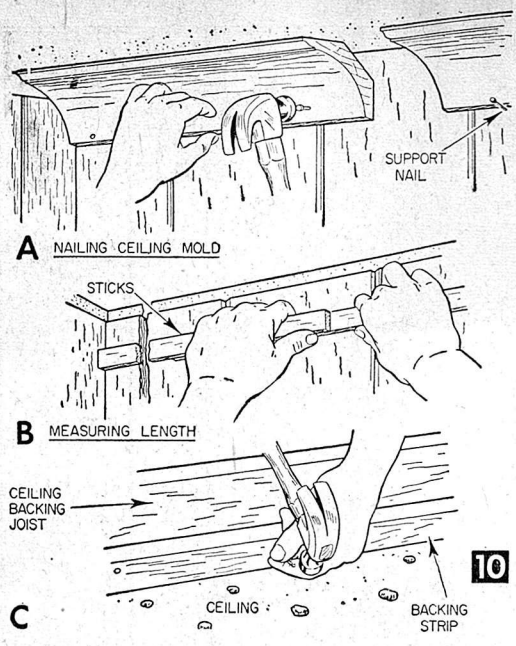
Stool projection must be increased, for ¾-in. board, either by replacing stool or by piecing out the old. To remove, pry off side stops and apron, pull out stool, and nail a strip to the edge of the sill to bring it flush with furring. Install boards below the window, the upper ends flush with sill top. Tack a piece of stool against the jambs by nailing into the board ends and scribe the shoulders by marking along a straightedge held against jamb faces (Fig. 7A). Saw the shoulders part-way and split out the waste. Push the stool between the jambs, parallel it with the wall, and scribe the ends to the wall and the inner edge to the sash (Fig. 7B). Spread scriber legs equal to the projection of stool rabbet outside the boards. When sawing the stool to fit against jambs, jog to fit the setback of the subcasings. Joint sash-edge of stool to give 1/16-in. clearance for sash, and "return" ends of stool by shaping to contour of front edge, using a piece of stool to scribe profile (Fig. 7C). The returns project beyond casings equal to the front projection.

With casements, where the special profile of stool and fitting of sash may make it difficult to replace stool, rip off its projection close to the wall (Fig. 7D); plane straight, and nail and glue on a wider piece, dropping it 1/16 in. for an offset which hides joint. To attach casings, install subcasings equal to furring plus board thickness, bringing jamb flush with wall surface; then, apply casings as in new work (Fig. 8A). Door casings can be purchased in sets of two 7-ft. lengths and one 3-ft. header. To case a door, scribe side casings to fit floor, stand them in place and mark locations of the mitered corners. Check with a straightedge to determine whether wall boards project to recede from subcasings, and reproduce the condition in the miter box by placing a suitable shim under the rear edge in the first case, or under the front edge in the second case when mitering (Fig. 8B). Do the same with the head casing. If the opening isn't square, block casing out from the miter box side to the same angle it will occupy when placed, be-

TABLE B—NAILING SCHEDULE

Panel Thickness	Size Nails	Spacing	Lbs. per 1000 sq. ft.
¼ in.	4d finish or ¾ in.	6 in. on outer edges of panel; 12 in. on intermediate studs	4
⅜ in.	6d finish	6 in. on outer edges of panel; 12 in. on intermediate studs	7
¼ in.	¾ in. No. 19 brad (nailed and glued)	8 in. throughout	¾





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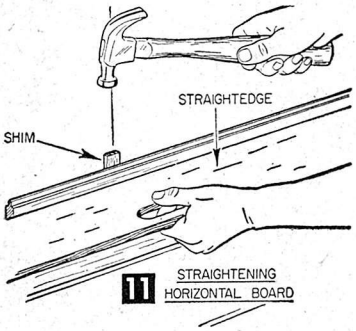
sides shimming for wall misalignment. Nail left casing first, nailing in the back edge before front. Next, hold head casing in place to mark the right end for length and, when fitting the miter, use a block plane for corrections. Fit right casing, and nail.

When window casings are mitered all around the opening, begin at the lower left miter and work around. Tack pieces as you go, so that you can remove them for further fitting if necessary. Projecting wall corners are best mitered, nailed and glued (Fig. 8C), although they can be butt-jointed and a corner mold used.

Before installing baseboard, nail strips along wall beneath board ends to support lower edges of baseboard which is shimmed up ¼ in. above the hardwood floor. Working from left to right, cut a piece of baseboard to extend full length of wall, if possible. To piece it, miter the joint with the lap in the direction of most usual viewing (Fig. 9A). Next, cut a 45° miter on end of other baseboard butting against it, then saw along edge A, Fig. 9B, to contour to form coped end to fit snugly against first baseboard. If there is a door, scribe along casing with a hook held against it, as in Fig. 9C. While baseboards can be fitted tightly, avoid such pressure that the casing and jamb are forced inward, causing the door to bind. If the fourth wall has no opening, cope both ends of the fourth baseboard against those in place, making it 1/32 in. longer, and spring in place. If the fourth baseboard must be spliced, cope and back-miter one piece and nail it down. Then cope corner joint on other piece, mark and cut splice and spring into place, nailing splice.



11 STRAIGHTENING HORIZONTAL BOARD

Choose ceiling moldings of a design that will be in harmony with baseboard and trim (Fig. 4B). If wall boards have simple V-joints, use a small, plain cove or almost flat molding wide enough to cover gap. If boards have wide decorative joints use large 2 to 4 in. moldings. Measure lengths of molding with a couple of over-lapping sticks gripped tightly at the lap (Fig. 10B) and, lacking somebody to help with a long piece, drive a nail a little below location of lower edge to rest molding on (Fig. 10A). Nail small molds along the bottom only; larger, sprung molds may require nailing into the ceiling also, which can be done at ceiling joists. For molding parallel to joist direction, angle and drive long finish nails into the backing joist. In a single-story house, climb into the garret and nail 2 x 2-in. backing strips along the backing joist (Fig. 10C).

A base shoe at the floor is the finishing touch for walls, narrow ⅜ by ¾-in. quarter-round being best if practical. It can be substituted for baseboard where boards come close enough to the floor. With hardwood-block flooring ¾-in. or 1-in. quarter-round is recommended. Over block flooring on a concrete base shim up base shoe molding 1/16 in. to permit block movement.

Wall boards placed horizontally can be nailed through plaster studs, shimming if necessary (Fig. 11), however, furring over studs is better. When covering masonry walls, use furring. (*Caution.* First make sure walls are dry, or have been waterproofed against seepage.) If wall boards are to be used as wainscoting below vertical boards, make the juncture below or above the height center of the wall. For flush effects groove the vertical board ends to fit over the horizontal tongue, or use a filler strip between.

How and When to Use PLYWOOD WALLS AND CEILINGS

With their many varieties of veneers and textures, plywood wall panels (Fig. 13) and ceiling squares (Fig. 14) have the advantages of being non-splitting, resistant to warping, and easy to install with a minimum of labor and time. Plywood also has fair insulating- and sound-absorbing qualities and imparts structural stiffness when properly installed.

The simplest and most economical method of installing plywood panels is to start at a corner of the room where a full panel can be used and to continue with full sheets to the end of the room (Fig. 15A). With normal 16-in. stud spac-

TABLE A—HOW TO SELECT

	KIND	SIZE AND THICKNESS	HOW TO APPLY
1	SOLID-BOARD TONGUE-AND-GROOVE PANELS	3/8-3/4 in. thick, 4, 6, 8 in. wide; 3-18 ft. long	Nail or staple to furring. In new construction sometimes laid on studs and blocking. Back and edge sealing recommended
2	EXTERIOR SIDING	same, widths to 11 1/2 in., lengths to 20 ft.	Same, only nailed
3	PLYWOOD PANELS	1/4, 3/8, 5/8, 3/4 in. thick. Heavier sheets for structural panels. 48 by 96-120 in.	Nail or naii and glue to new construction. Fur over old walls. Back and edge sealing recommended. Waterproof masonry
4	PLYWOOD BOARDS	1/4 in. thick, 16 in. wide, 36-96 in. long	Clipped to old walls or to furring, old or new construction. Can be nailed. Back and edge sealed
5	PLYWOOD SQUARES	1/4 in. thick, 12-16 in. square	Same
6	VENEERS, SHEETS	12-24 in. wide, 8, 10, 12 ft. long	Cemented to any solid backing. Waterproof walls
7	VENEERS, WOVEN	1/16 in. thick, 48 in. wide, 96 in. long	Same
8	HARDBOARD, SHEETS	1/8, 3/16, 1/4 in. thick. Heavier sheets 1/2, 3/4 in. thick rarely stocked for structural panels. 36, 48 in. wide, 96-120 in. long. Cut sizes available	Cement thin sheets to plastered walls, nail to new stud and block construction, or to furring over masonry
9	HARDBOARD, CHIP CORE	3/8, 3/4 in. thick, 24-72 in. wide, 72-144 in. long, heavier sheets for thin walls, etc. —rarely stocked. Cut sizes available	Same
10	HARDBOARD, PERFORATED	1/8, 3/16, 1/4 in. thick, 24, 36, 48 in. wide, 36, 48, 72, 96 in. long. Cut sizes available	Same; also in frames
11	INSULATION BOARD, SHEETS	1/2 in. thick, 48 in. wide, 72, 84, 96, 108, 120, 144 in. long	Nailed, preferably over furring. Battens generally used
12	INSULATION BOARD, BOARDS	1/2 in. thick, 8, 12, 16 in. wide, 96, 120, 144 in. long	Nailed or stapled, preferably over furring
13	INSULATION TILES	1/2 in. thick, 12, 16 in. square, 12 by 24 in., 16 by 32 in.	Same
14	GYPSUM BOARD	3/8, 1/2, 5/8 in. thick, 48 in. wide, 96-144 in. long	Nailed over studs and blocking or over furring. Joints taped and puttied or covered with battens. Second ply crossing first, cemented, with or without nails
15	GYPSUM BOARD, WOOD-GRAINED	3/8 in. thick, 48 in. wide, 96 in. long	Nailed over underlayer or smooth plaster
16	PLASTIC, OR ENAMEL SKINS ON HARDBOARD	1/8, 5/32, in. thick, 48 in. wide, 60, 72, 96, 144 in. long	Cemented over smooth walls or new construction with plywood or hardboard backing. Usually metal trim, plastic base cove. Also prefinished hardboard trim
17	PLASTIC SKIN ON HARDBOARD, BOARDS	3/16 in. thick, 16 in. wide, 96 in. long. Smaller sizes available	Cemented over smooth walls and held with clips. New construction, furring and clips if not backed. Metal or hardboard trim
18	PLASTIC SKIN ON HARDBOARD, SQUARES	3/16 in. thick, 16 in. square	Same
19	PLASTIC SHEETS	1/16, 1/10 in. thick, 24-48 in. wide, 96 in. long	Cemented to old walls or backing in new construction. Metal molds or hardboard
20	PLASTIC SKINS	18 to 54 in. wide in rolls	Cemented to smooth old walls or backing
21	FIBERGLASS REINFORCED SHEETS CORRUGATED	1/16, 1/10 in. thick, 14, 26, 27 1/2, 33, 33 3/4, 35, 36, 40, 42 in. wide; 36, 48, 60, 72, 84, 96, 120, 144, 166 in. long. Corrugations, crown to crown (pitch) 1 1/4 to 4 1/2 in.	Hold in frames with wood or metal closures
22	FIBERGLASS, FLAT, RIBBED	1/20, 1/16, 1/10 in. thick, 16, 24, 30, 32, 36 in. wide, 48, 60, 72, 96, 120, 144 in. long	Same
23	PLASTIC TILE	4 1/4, 8 1/2, 10 in. square	Cemented to backing
24	METAL TILE	4 1/4, 8 1/2 in. square	Cemented to backing
25	CERAMIC TILE	Various: typical, 1 1/4, 4 1/4, 8 in. square	Cemented, usually only professional application
26	VINYL SHEETS	1/20 in. thick, 54 in. wide, in rolls	Cemented to backing. Metal or hardboard trim
27	VINYL TILES	1/20 in. thick, 8 in. square	Same
28	LINOLEUM-TYPE SHEETS	1/20 in. thick, 36, 54 in. wide, in rolls	Same
29	LINOLEUM TYPE TILES	1/20 in. thick, 9 in. square	Same
30	CORK TILES	1/8 in. thick, 9 in. square, 6x12 in.	Cemented to backing
31	PIGSKIN TILES	1/8 in. thick, 4 1/2 in. square, 4 1/2 by 9 in. Smaller available. Special sizes cut	Cemented to backing

WALL COVERINGS

RECOMMENDED USES	ADVANTAGES	DISADVANTAGES
Walls in dry locations; old or new construction	Available in many woods. Durable. Medium to high cost. Fairly easy to maintain. Easy to cut and apply. Does not dull tools. Light weight. Has insulating value	Shrinks and swells. May check. Trim must be removed. Not fireproof
Same	Available in soft woods, some hard. Otherwise, as above	Same
Same. Common fir plywoods for inexpensive construction, hardwoods for fine work	Available in many woods. Durable and rigid. Fairly easy to maintain. Medium easy to cut and apply. Does not dull tools. Light weight in thin sheets. Spectacular paint effects possible on textured patterns; handsome hardwood finishes. Some insulating value. Will not split, shrink, or swell.	Grain rises after finish with fir panels. Not fireproof. Trim removed. Textured types catch dust
Same	Light and easy to handle. Plywood qualities	Not fireproof. Trim removed
Same	Same. Can be applied parquet-style	Same
Where rich seamless hardwood facing is desired. Curved walls	Variable to matched-hardwood grain effects. Reasonably durable. Flexible, applied like wallpaper. Not necessary to remove trim. Fairly easy to maintain	No structural strength. Requires rigid, non-shrinking backing
In rooms where parquet effects are desired	Available in fine hardwoods, diamond and parquet patterns. As above	Same
Service rooms, rumpus and game rooms, bath rooms	Good paint base, takes stain, natural finishes in light wood to brown colors. Durable, hard surface resistant to scuffs and dents, easily maintained, easy to cut, covers rapidly, warp and shrink resistant	No grain character in smooth panels
Same, better rooms	Attractive flaked figure suitable for stain, natural finishes. Durable, hard surface in pine or redwood, resistant to scuffs, easily maintained, easy to cut. Warp and shrink resistant	Molding shows porous core
Modernistic effects, game and service rooms, etc.	Punched with holes to take wire brackets for hanging items; available in some prefinishes; also embossed to imitate leather; hard resistant surface, easily maintained, easy to cut. Warp and shrink resistant	Dust catching
Most rooms for inexpensive construction	Prefinished white or cream, smooth or textured surface, square or beveled edges. Can be painted. Easy to cut, light weight. Good insulation	Easily scuffed and punctured
Most rooms for inexpensive construction	T & G, prefinished in a variety of colors. Can be painted. Low-cost. Easy to cut, light to handle. Universally obtainable. Good insulation	Same
Especially for ceilings. Acoustic (semi-perforated) to control room noise	Same. Square and rectangular tiles can be mixed and laid in a variety of patterns	Same
All walls	Good substitute for plaster. Dry wall construction. Applied single or double ply. Inexpensive. Rapid application. Fireproof	Rather easily scuffed. If two-ply, laborious. Poor insulation
Rooms for inexpensive wood-grain decoration	Three wood finishes available. Applied with or without battens. Cleaned with damp cloth or mild soap	Rather easily scuffed
Especially for service rooms, bath, wainscots	Many rich, glossy colors. Tile and board patterns. Resistant to shocks, dirt, staining. Bends to large curves. Can be fitted against trim	Rather hard to cut. Dulls tools
Same	Same. Easy to handle.	Same
Same	Same	Same
Same	Many rich, glossy colors and patterns. Very durable. Resistant to ordinary solvents, stains. Easily cleaned with damp cloth and mild soap. Almost abrasion and puncture-proof. Can be slipped under edges of trim	Brittle until mounted. Hard to cut. Dulls tools
Same	Same. Inexpensive plastic	Tends to shrink
Walls and screens to admit and control light	Many translucent and opaque colors. Very durable, waterproof, resistant to ordinary solvents, stains. Easily cleaned. Almost abrasion and puncture-proof. Rigid	Dulls tools. Expensive
Same	Same	Same
Wainscots, showers, bathrooms, kitchens	Rich, sparkling colors; fairly easily fitted. Durable. Abrasive and puncture resistant. Waterproof. Eaisly cleaned. Resistant to dirt, ordinary solvents, stains	Can be scratched and broken
Same	Rich, sparkling colors; easily fitted; durable. Waterproof. Easily cleaned. Resistant to dirt, ordinary solvents, stains	Can be scratched and dented
Same	Rich, sparkling colors; durable. Abrasion and puncture resistant. Fireproof. Waterproof. Easily cleaned. Resistant to dirt, ordinary solvents, stains	Brittle, hard to cut and fit, slightly irregular, mortar grout may flake out
Same, but not showers	Good selection of colors; durable. Abrasive and puncture resistant. Easily cleaned. Easily fitted	Can be cut
Same as sheets	Same	Same
Wainscots, kitchens, bathrooms	Large variety of glossy bright colors and tile and board colors. Fairly easily fitted. Easy to clean. Inexpensive. Trim not removed	Easily torn in applying
Same	Variety of colors and patterns. Easily handled and fitted. Inexpensive. Trim not removed	Joints must fit
Wainscots, walls	Tan color blends with most decor; easily cut and fitted. Easily handled. Trim not removed. Resilient	Only one color. Stains and dents easily
Same	Same	Only one color. May shrink

Etched Douglas-fir plywood applied flush with plasterboard adds a distinctive touch to any interior. Here, door casing is being installed as wainscot cap.

For a modern-wall treatment, install a quarter-round molding in place of the conventional baseboard at the bottom of the plywood wall paneling.

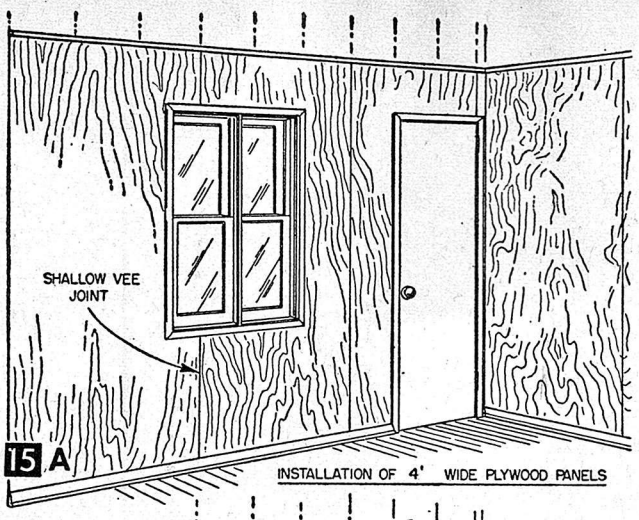
ing, joints fall on every third stud. One or more panels will usually have to be cut narrow, and window and door openings make well-proportioned joint spacing a problem. One solution is to subdue joints by finishing the wood to reduce grain contrast. Striated-plywood joints are lost, because they resemble the surface grooves.

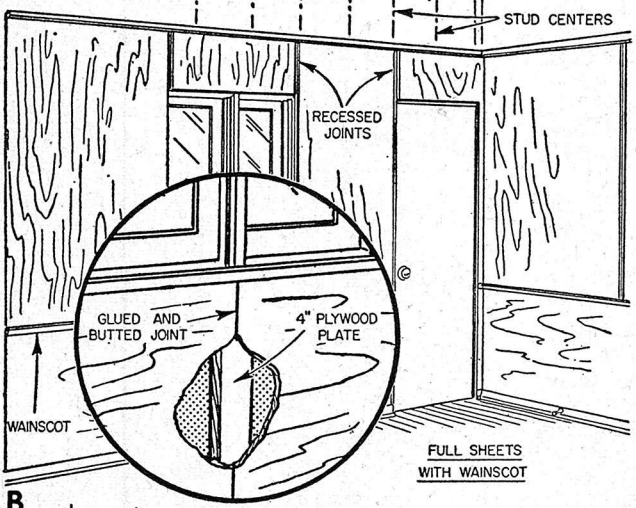
Plain panels trimmed to join on window and door studs, recessed joints and a continuous wainscot covering lower part of the wall is another treatment. The flush butt joint under center of window (Fig. 15B) is made by gluing a 4-in. wide plywood plate to back of two panels of closely matching grain before installing.

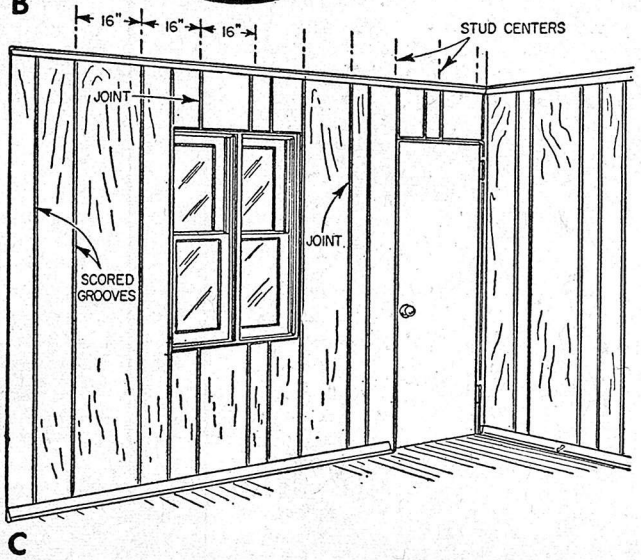
(Hardwood Plywood Institute)

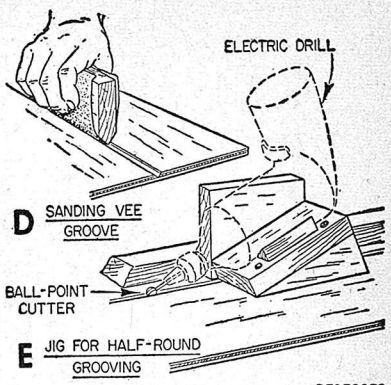
Above, Red gum, 16 in. plywood ceiling squares installed with grain running in alternating directions create a checkerboard effect on the ceiling of this recreation room.

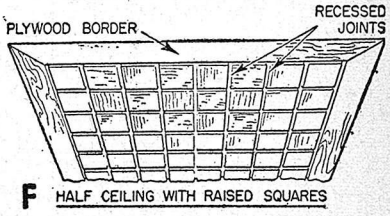
Left, ¼-in. thick by 16 in. wide plywood, faced with flat-cut Honduras mahogany veneer has been used here to achieve a solid-board paneling effect while retaining the stability, flatness and grain patterns of plywood paneling.





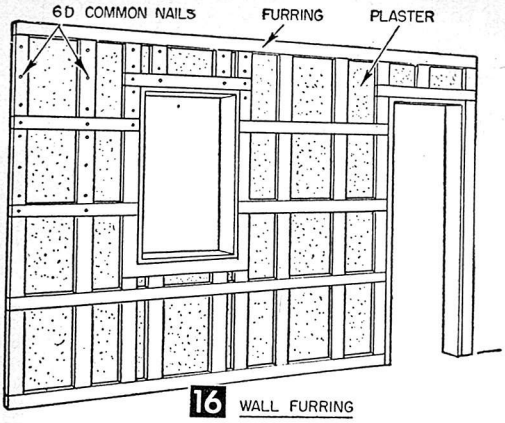






For a random-board effect, use 16-in. interval factory-grooved sheets, having extra grooves added. Or you can cut the grooves yourself in plain panels to simulate random-width, solid-wood paneling (Fig. 15C). Attaching nails can then be driven through these grooves into the studs. Cut vee-grooves with a power router, or with a portable power saw tilted 45°. Smooth sawed grooves with sandpaper backed with a sharp-edged block, as in Fig. 15D. A jig built of scrap wood to cradle a power drill clamped at an angle to hold a ball-cutter at the best angle for making rounded grooves is still another method (Fig. 15E).

If you are building a new home and plan to have a plywood ceiling, ceiling joists can be placed with one at the center of room or spaced apart at the center. The other ceiling joists are then spaced regularly toward the ends of room for best use of the plywood panels. Old ceilings often present the bugbear of uneven spacing. One way of overcoming this is to nail furring strips at right angles to the ceiling joists and space them as for new construction. Then fasten the plywood panels to the furring strips. Better is the random board plan, or the use of striated sheets or squares. An underlayment of 5/16-in. sheathing-grade plywood permits nailing anywhere and allows application of symmetrical patterns. A popular arrangement is squares butted, with deep vees, or with recessed

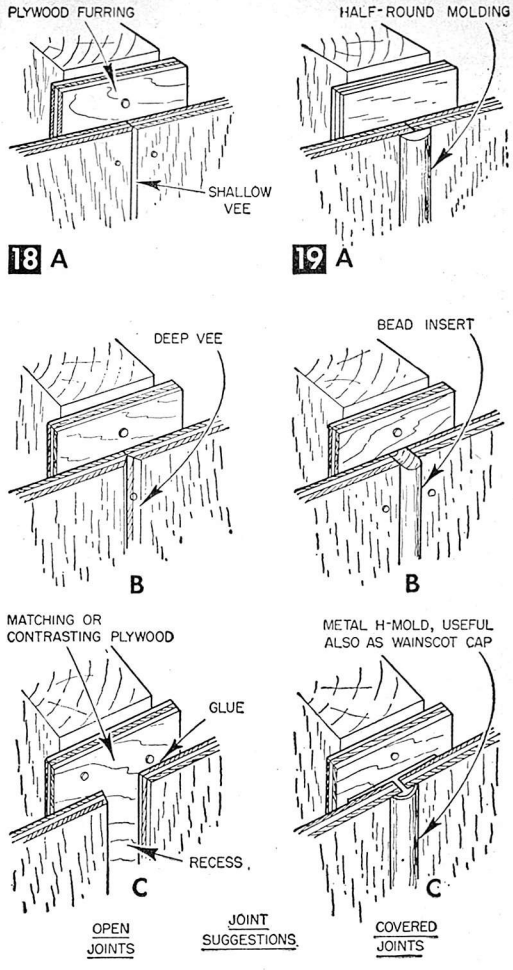


16 WALL FURRING

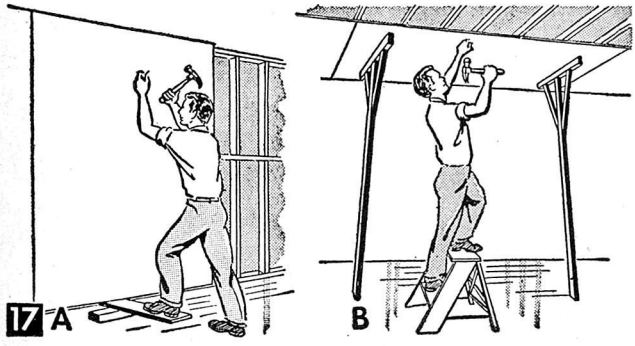
joints, using stock sizes of 12, 16, or 24 in., or other sizes cut from standard sheets. Since most rooms are not evenly spaced in both directions, draw the plywood squares to scale on paper and determine by trial and error what size square fits best. Avoid cutting squares by running a border around the edge (Fig. 15F), perhaps with end margins wider than side margin. Rectangular dimensions can be calculated to come out even in both directions by using channeled or recessed joints, widening them, if need be along the length of the room. Install ceiling before walls.

Preparation for remodeling. Most casings around doors and windows can be left on if they harmonize, but it is usually best to remove backbands. Scrape and sand off any paint lumps or ridges. If you want matching trim, remove the old, and remove picture molds and baseboards. If increasing depth of jambs is necessary, follow procedure given earlier on pages 63 and 64 for solid-board paneling.

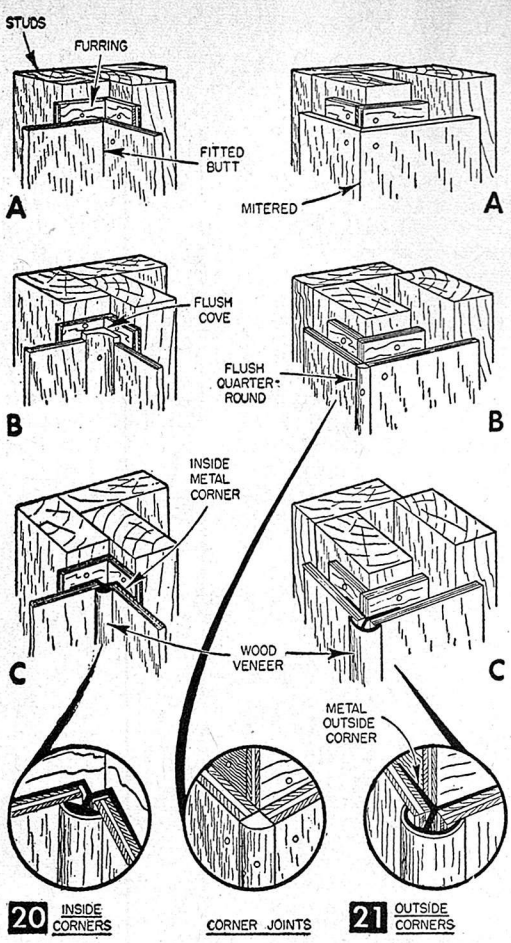
Old plaster is usually reasonably flat, a good base for overlaying plywood. Some manufacturers recommend 1 by 4-in. furring spaced horizontally 16 in. apart, but the general practice is to saw 2 or 2½-in. wide strips from ¼-in. plywood, nailing them to studs with a horizontal spacing of about 16 in., one nail per stud, centered. Nail short pieces over studs that back-up the



joints and, for added stiffness for sheets, nail strips over other studs, and around openings, shimming out dips in the furring (Fig. 16). Sheathing underlayment, if used, must be applied so that its joints and those of the facing are staggered. It can be laid flat over a bulgy wall by nailing shims in the low spots, aligning their faces with a straightedge.



Preparation for new work. Probably most plywood wall coverings are nailed directly to studs, and blocking, sometimes with disappointing results because of stud irregularities. If you use this method, frame with straight, No. 1-grade studding. Nail header blocks between studs for every 4 ft. of sheet length, and wherever joints occur. These will also serve as fire stops. For ceiling application, install header blocks. When ⅜-in. plywood is used, studs can be spaced 24 in. Apply furring strips to studs and along



headers, making window and door jambs of a width to come flush with plywood panels, as with plaster.

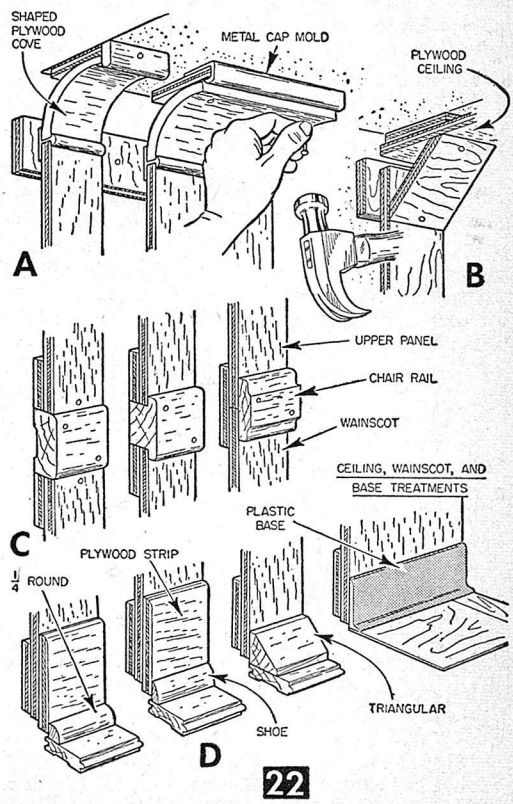
Install plywood only over waterproofed masonry walls and on furring strips. Where masonry nails fail to penetrate properly, make ½-in. holes with a masonry drill and drive in wood nailing plugs. Often it is easier to build a frame of 2 x 3-in. studs and plates, anchoring it to the masonry, providing space for wiring and shallow built-in cabinets, if desired.

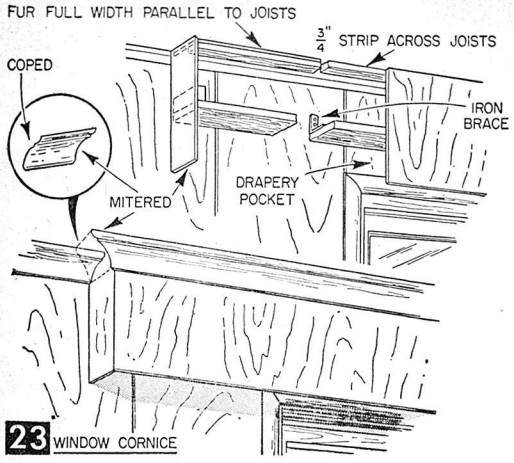
Installing panels: remodeling. Select panels and arrange them to concentrate flashy grain at the center of the wall or at the ends, with strong grain direction upward in vertical panels. Coat backs of sheets for outside walls with resin sealer or priming paint. The usual practice is to only nail on plywood sheets, but a much better job is done if they are also glued with urea or casein glue. The first is waterproof under normal conditions, the other water-resistant. Mix according to directions and paint a thick stripe along middle of furring strips, nailing as in Table B. Both glues require working temperatures of 65°,—higher temperatures hasten setting. A portable high-frequency electrical unit that sets urea glue almost instantly is available that literally spotwelds the panel to furring strips (eliminating use of nails), the glue between tacking points hardening normally.

Cut the starting edge of the first panel to fit in the corner with the other edge plumb and over a stud, apply glue, and tack in place. Then nail, working from the center out. Face nail at grain angles or in bottoms of serrations and the like, or drive them in one side of a vee-groove. The next panel is butted, or spaced by inserting a gaging strip in the joint for nailing. Lacking help, wall or ceiling panels are easily installed as in Fig. 17A or B. Over masonry walls install bottom edges of panels about 1 in. above the floor to promote ventilation behind.

Open joints can be made several ways, as in Fig. 18. The arrises in Fig. 18A are lightly chamfered with sandpaper to prevent splintering. In Figure 18B the edges are butted and accented with a deep vee joint. The recess in the open joint (Fig. 18C) is backed by a plywood furring strip of the same or contrasting color for increased accent. Furring is nailed to studs and glue applied at the edges for plywood panels.

Covered joints are shown in Fig. 19. In Figure 19A the edges are butted and covered with a molding, generally matching the color of panel; in Fig. 19B a strip with a projecting bead is in-





serted in the joint by blind-nailing it against previous panel; in Fig. 19C stock extruded aluminum molding of H-section is used. Bead is faced with matching veneer. Slip it over a loose edge, nail through web, and insert next panel edge. Where metal molds are used throughout, it may be necessary to face-nail through plywood and molding web on last piece.

Inside corner treatments are shown in Fig. 20. In Figure 20A one panel is scribed to fit neatly against the one on the other wall; in Fig. 20B a flush cove mold is installed and edges of sheets fitted to it; in Fig. 20C a metal inside corner mold is nailed in the corner and panel edges inserted into grooves. Outside corners can be treated as in Fig. 21. In Figure 21A miter edges of panels are mitered, glued and face-nailed; in Fig. 21B inner arrises of panels touch and a quarter-round is nailed into the angle and sanded flush; in Fig. 21C metal mold laps edges.

Plywood panels seldom reach the ceiling, the gap being covered with moldings as for solid-wood paneling, or shaped or flat plywood coves can be used (Figs. 22A and B). If you prefer, a wainscot, wainscot cap or chair rail can be inserted between panels, or rabbeted at the edges to lap them (Fig. 22C).

A number of baseboard treatments are possible as in Fig. 22D. A solid wood baseboard is best if it matches color of wall covering. If a hardwood block floor is present, raise the baseboard and shoe to allow for movement of the blocks. Plastic base cove is good with tile floors.

Plywood is ideal for cornice boxes (Fig. 23). Miter the corners and support by a ¾-in. thick shelf fastened to wall with angle brackets. Make cornice pocket large enough to contain traverse rod and drapery.

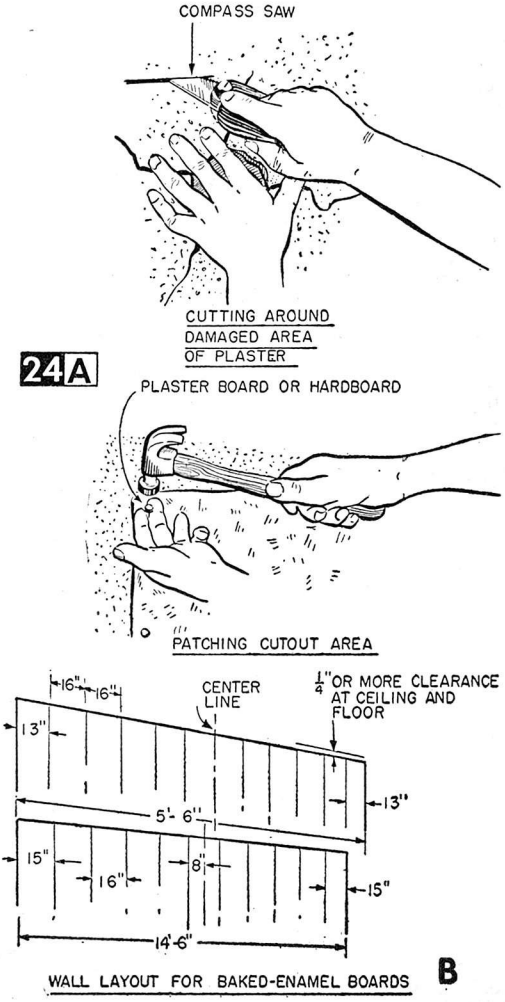
When applying squares to walls or ceilings tack on a straightedge at the center to butt a starting row. For diagonal treatment nail a straightedge at a 45° angle at a strategic point on the sheathing underlay and tack a second at right angles to the lower end. Fill in the vee, remove straightedges and complete installation.

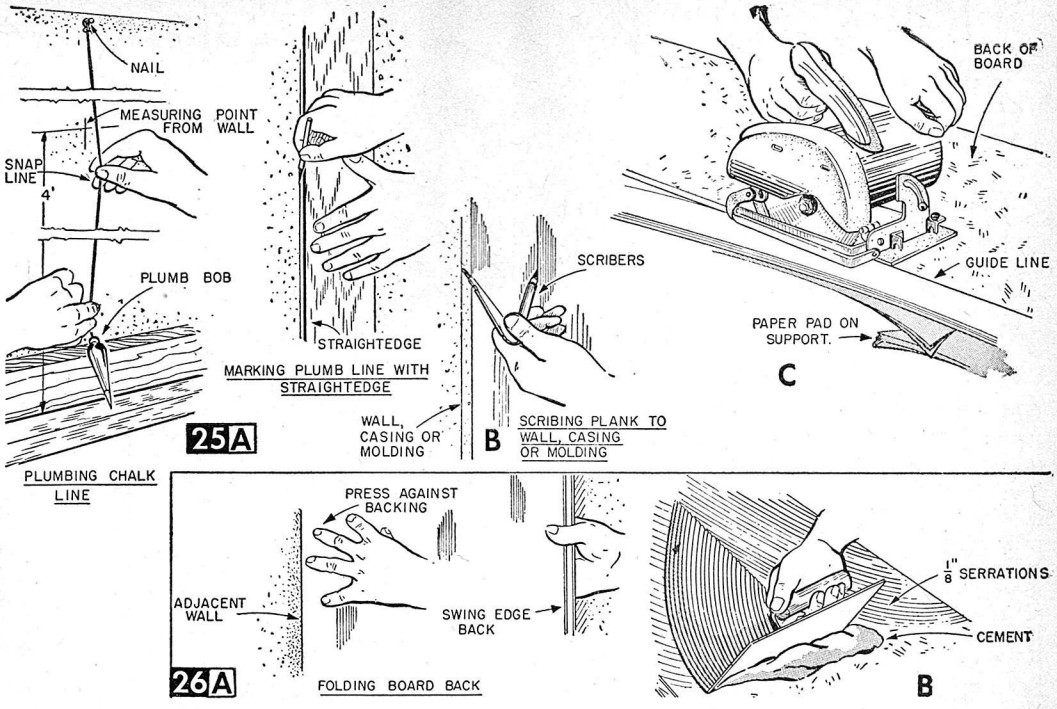
USING FINISHED HARDBOARDS AND FIBERGLASS PANELS

Hardboards—fabricated sheets that are tough, grainless, non-checking and splitting—are ideal for color finishes. Enamel surfaced types are available in solid bright and pastel colors and in a wide variety of patterns, some simulating polished hardwoods and veined marble. In addition, boards and tiles are made for bathrooms and other service areas, with matching hardboard moldings, metal moldings, plain and finished like the boards. Stock wooden molds are also applicable.

Boards, tiles and squares are ideal for use when remodeling, being light, easily-handled units with T&G edges secured to walls with clips, or clips and adhesives.

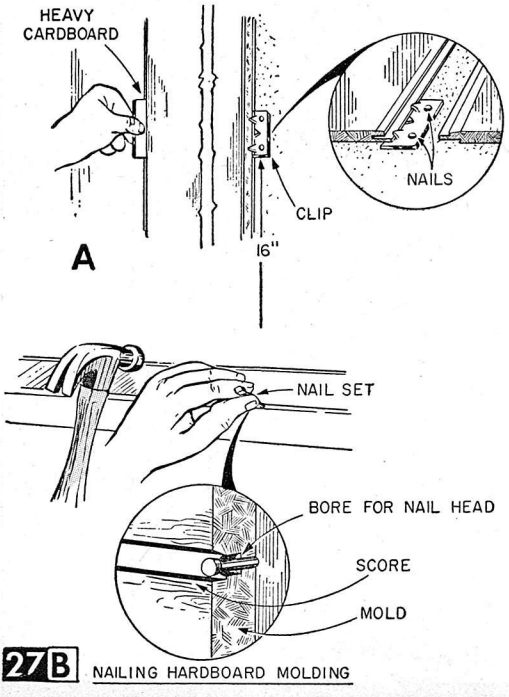
These materials come in cartons and, if the weather is rainy or otherwise excessively humid, thoroughly dampen the backs and stack them,

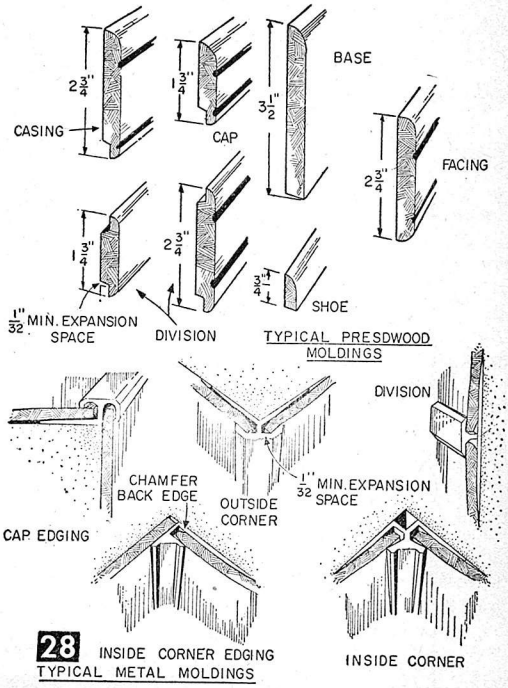


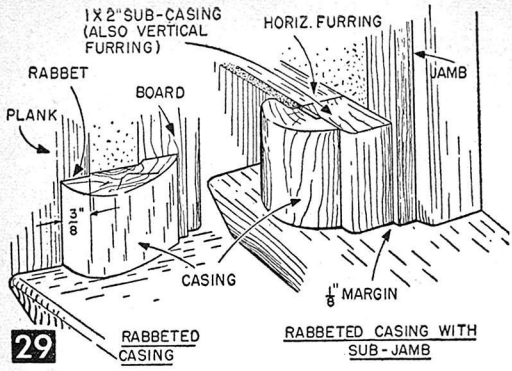


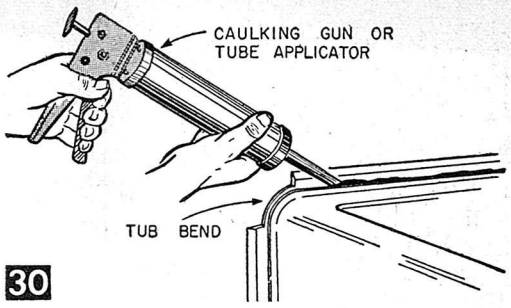
back to back, on a flat surface to season for 24 hours. If uncertain as to the need for such conditioning, consult your local dealer. As a precaution against abrasion, lay sheets of newspaper between the finished faces.

Most dry, old plaster, or plaster-board walls that are flat, are suitable backing for boards, tiles or squares. Scrape off all loose paint, paper, or plaster, and repair large depressions or holes (Fig. 24A), and remove baseboards, win-

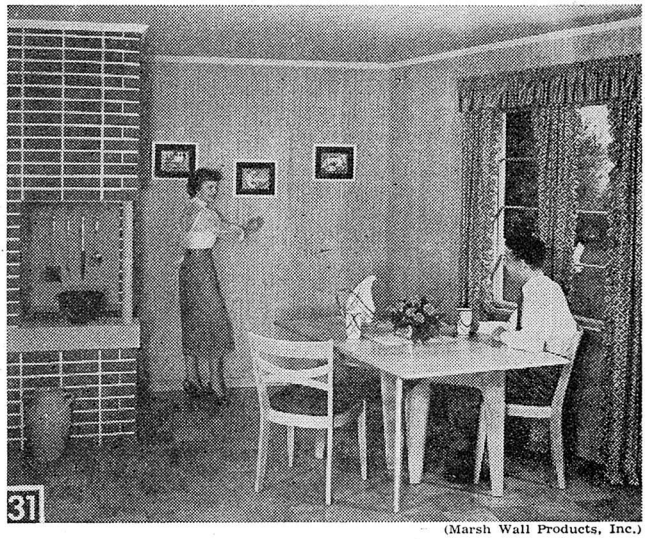






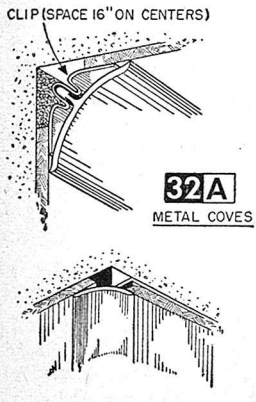


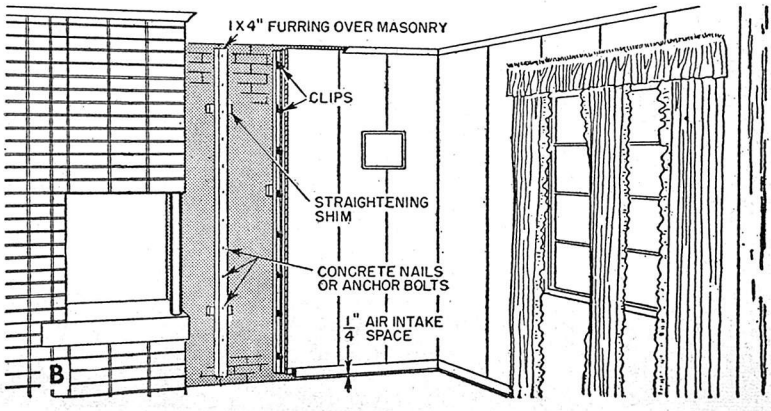
dow and door cap molds, backbands, and picture molds. Disregard stud spacing, locate wall center and lay off board widths from right and left so end units are of equal width (Fig. 24B). Start board installation at one corner of room by plumbing a mark on wall where groove-edge falls, using a chalked plumb line or running a pencil along a straightedge (Fig. 25A). If you use a corner mold, measure distance from wall to line at floor and ceiling, transfer measurements to first board, and mark a guide line with a straightedge. If no mold is used, stand board on a block of suitable thickness with grooved edge of board toward area to be covered, plumb it, and tack with a nail at top and bottom. Spread dividers or scribers to the width of strip to be cut off and mark (Fig. 25B). To hand saw, support board (face up) on solid backing, using a fine-tooth saw. With an electric saw, turn face down, protecting it with a pad of papers laid on support (Fig. 25C). Special cement as well as attaching clips are recommended and, if there is any doubt about the holding power of the wall, cement is mandatory. Spread a thin coat of approved adhesive with a serrated trowel (Fig. 26B) to back of board and to wall. Set board in place with trimmed edge contacting adjoining wall, and fold board against its backing (Fig. 26A). Snap on clips near top, bottom, at the center and two evenly spaced between; or space about 16 in. on centers. Cutouts must be made for wall switches and receptacles. Drive nails supplied, or use common lath nails driven with light blows to get maximum holding power. Don't force edges of boards

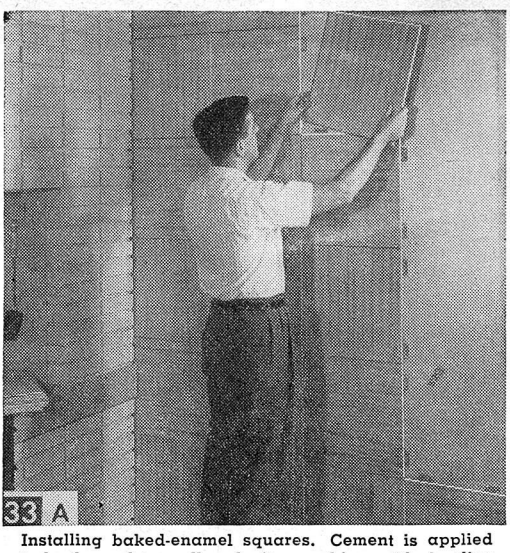


(Marsh Wall Products, Inc.)

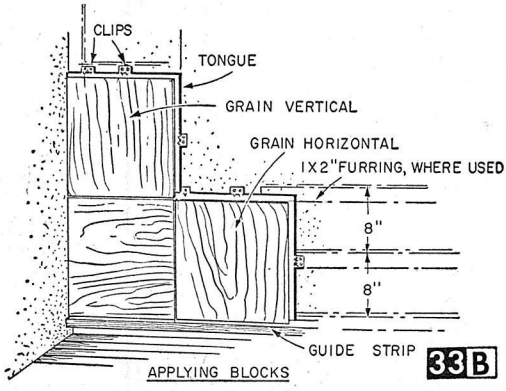
Wood-grained, baked-enamel board paneling adds a modern touch to this dining area.

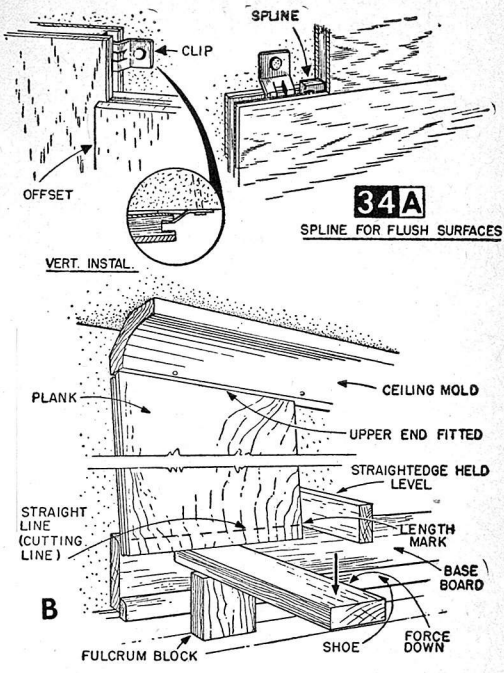






Installing baked-enamel squares. Cement is applied to backs and to wall and after meshing a block, clips are snapped on and nailed to the wall.





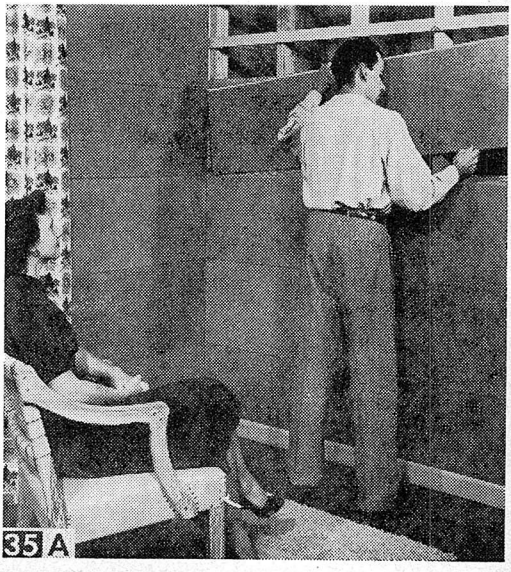
together; allow about 1/32 in. space, gaging with a piece of heavy cardboard to provide for expansion (Fig. 27A). Continue installing boards until the last one, which is fitted to the next wall (unless the boards are continued around), only cementing last board. If boards are slightly shorter than room height cover with moldings (Fig. 28) at top and bottom.

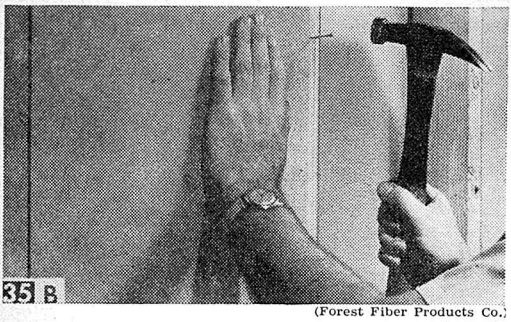
Scribe the boards around openings, against complete casings, or roughly against casings where backbands will cover joints. At door and window heads, where cap molds are to be added, fit can be rough. Remove apron under a window stool and fit boards under stool, or cover joint with a mold, if you prefer boards to fit under apron.

Install boards over plaster in new work as over old walls, or fur bare studs horizontally with 1 by 4-in. strips spaced 16 in. on centers, wedged plumb, if necessary. Fill in with vertical strips at corners and openings. When the ceiling of a room is to be covered with squares, install them first.

When applying single-member casings over a resurfaced wall, rabbet backs to a depth of wall-covering thickness, or use rabbeted hardboard molding. If furring has been used, build out jambs with sub-casings, which also function as vertical furring. Set them back 1/8 in. from the jamb faces to avoid a flush joint (Fig. 29). On new construction make the jamb widths sufficient to bring edges flush with wall-covering surface. When working toward a window opening over plaster, notch board over stool end.

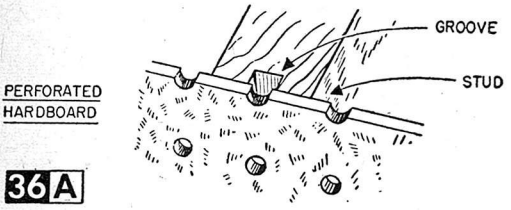
If you prefer hardboard moldings, install like wood moldings, with finish nails driven into the



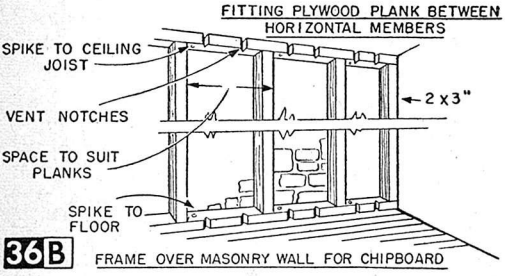


35 B

(Forest Fiber Products Co.)

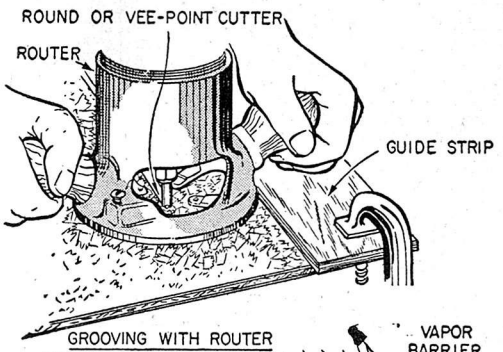


36 A

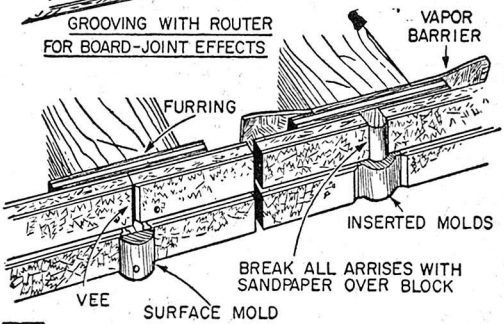


36 B FRAME OVER MASONRY WALL FOR CHIPBOARD

Apply T and G hardboard planking over furred wall studs. Nails are driven through the tongues and covered by succeeding boards.



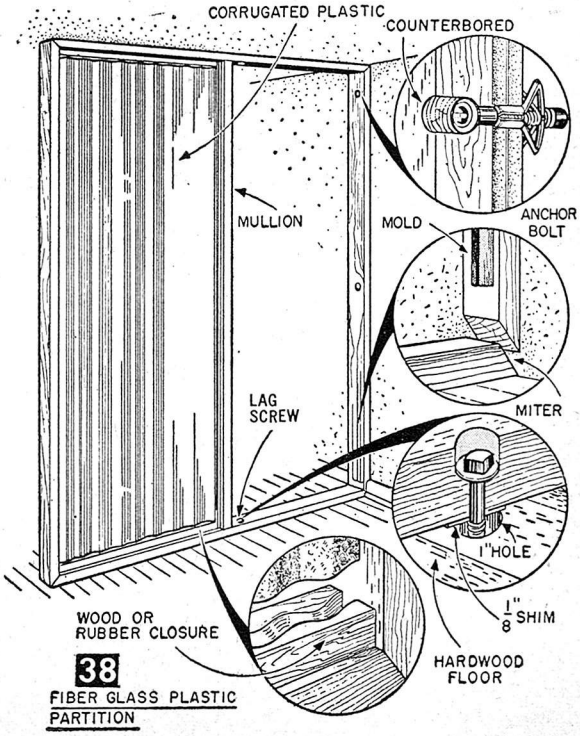
GROOVING WITH ROUTER FOR BOARD-JOINT EFFECTS



37 WOOD CHIPS VENEER HARDBOARD

grooves, if present. Drill holes slightly larger than nail heads half-way through molding and set heads (Fig. 27B). Metal moldings are usually nailed in place and the board edges slid into them, with a space of at least 1/32 in. for expansion (Fig. 28). Around bath tubs and showers set metal moldings in corners, using at the front of a tub, bends that carry a continuous band along the top and down the front. On all such installations fill moldings and grooves with mastic designed for the purpose (Fig. 30). Remove surplus mastic before it dries. Fur masonry walls vertically to allow circulation of air, and place baseboard 1¼ in. above floor to admit air (Fig. 32B).

Squares are usually 16 in., installed, basically, the same as boards (Fig. 33A). After determining width of starting space, strike a guide line for the forward or grooved edges of the squares, and take measurements from it to the wall for scribing squares to the wall. Like boards, gage joints with cardboard to insure at least 1/32-in. expansion space. Check irregular spacing to prevent "running," or squares climbing in places. Begin installing at a bottom corner with a square fitted to the near wall and one tongue-edge down, the



38 FIBER GLASS PLASTIC PARTITION

other having been trimmed if it is to fit against wall. Guide the first row by resting squares on a strip of wood tacked level at the bottom. On new work place furring strips over studs at 8-in. centers (Fig. 33B).

Boards are available as thin, prefinished hardwood plywoods. While they can be installed in several ways, as over studs spaced to fit, furring, or an underlay of 4 by 8-ft. 5/16-in. plyscord sheets, the usual manner is similar to baked-enamel boards, but without cementing. One popular brand is grooved on both edges and engaged with the back flange of one edge inserted in the groove of the previous panel. Clips are secured with cement-coated or screw nails, or with 3 or 4-penny lath nails. Tap joints together with a hammer and block to avoid damaging edges. If end-joints are made in the boards, or if they are put on horizontally, use splines and butt joints (Fig. 34A). Select for sequence of color and grain. As a slight lap-effect is gained, decide in which direction it is to be. Boards can be scribed to fit against the ceiling, or they can be fitted between horizontal members such as ceiling molding and baseboard and the like (Fig. 34B).

Joint placing, trim fitting, and use of moldings similar to those for solid-wood paneling can be put into practice when installing pre-finished plywood boards. Seal backs of boards and, on outside walls, use a glossy, asphalt paper vapor barrier in addition, under boards, or over furring strips where used.

While inexpensive, unfinished T & G hardboard boards make a neat wall surface that can be painted, it also can be waxed for a natural finish. Install it over plaster with nails and cement, or on bare studs or furring strips, with nails or staples driven into the tongues (Fig. 35 A and B).

Sheet hardboard is applied by cementing, cementing and nailing, or nailing (or screwing) over solid backings, studs, or furring strips.

The perforated hardboards so popular for display backgrounds, tool and utensil racks are handsome in their own right as wall coverings. Space framing members 16 in. apart, maximum. Where holes fall over solid supports the studs can be painted black for the appearance of a hollow space, or the support may be grooved where line of holes falls for brackets insertion (Fig. 36A).

For normally humid conditions, unwrap hardboard panels and place them separately on edge lengthwise around the room for 24 hours before installing. If they have been abnormally dried, as when shipped from an arid locality, scrub cold water into the texture side of each piece with a stiff broom, pair texture sides together, stack and cover with a tarpaulin for 24 hours.

Tempered boards to be installed in kitchens and bathrooms, where fluctuating humidity conditions occur, should be stacked with two thicknesses of wet newspaper over each face, and covered with a tarpaulin for 24 to 36 hours. This conditioning is also recommended if the atmosphere is materially dryer than usual, as when there has been a lack of rain for some time.

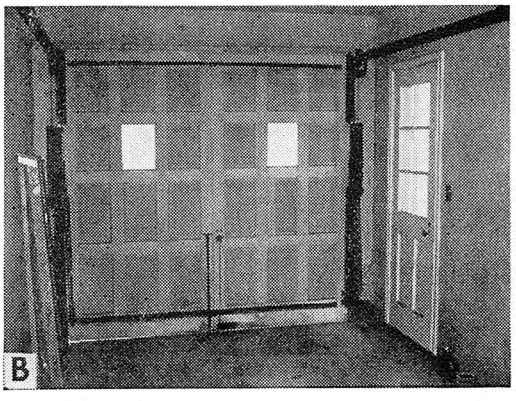
Install 3/8-in. chip-core, hardboards much like plywood, nailed and glued to 1/4 by 2½-in. plywood furring strips nailed to studs and around openings, or else over furred plaster, all joints over furring. Over masonry, install 2 by 3-in. furring plumb and level (Fig. 36B), and seal backs of panels with spar varnish or primer-sealer paint just before installing. For added protection use asphalt-impregnated vapor-barrier paper under furring.

INSULATING WALLBOARDS

Insulation-type wallboards are inexpensive, and light to handle. Their textured surfaces are available in many prefinished colors, and they can be applied in almost unlimited patterns. Having excellent insulating properties, they are often substituted for other types of insulation. While easily marred, most walls are rarely subject to puncturing shocks, and where this possibility exists, these boards can be applied above a hard-surface. This product is installed over furring strips, or directly over rough framing; boards are secured with nails through the tongues or stapled with staplers loaned or rented by many dealers, while some brands are clipped. The safest method of installing a ceiling with regular courses is to start from the center and work toward the edges, either by centering a joint or a square. As the material is soft, care must be taken to force each joint with the same pressure, or the courses will run seriously, so keep constant watch and loosen or tighten joints as irregularities in joints appear. Square-edge sheets are joined without attempt to disguise joints, usually covered with flat or contour batten.

Fiberglass panels in several colors with various degrees of light transmission are available in thin sheets, mostly corrugated like sheet metal, but are also available flat with ribs. Popular for outdoor walls, they have indoor uses, as well. While they can be applied to walls as coverings, a better use is to employ these panels as complete walls, in such places as dividing partitions between breakfast room and kitchen, dining area and living room, and the like. The panels are rigid enough so that they require support only at top and bottom. Vertical and horizontal installations require a frame of 2 by 3 or 4-in. members. Nail top member through crossing joists or, if it parallels them, use anchor bolts countersunk flush. If the base member is mounted on a hardwood floor, particularly blocks, bore 1-in. holes in the flooring to permit expansion movement, place 1/8-in. shims under the base and tighten 1/4-in. lag screws lightly. Nail wood or rubber closure strips against faces of the plastic at top and bottom, and bind edges with quarter-rounds, base shoe, or other molds. If two or more widths of panel are required, install a mullion or mullions between (Fig. 38).

1 A



B

New family room (above), built in space originally used as a garage (right), features natural willow paneling, beamed ceiling and cove lighting. Dutch door was installed to provide ventilation alongside fixed window. They replaced the overhead-type garage door and overlook new patio and landscaping. Garage side door was removed and wall closed.

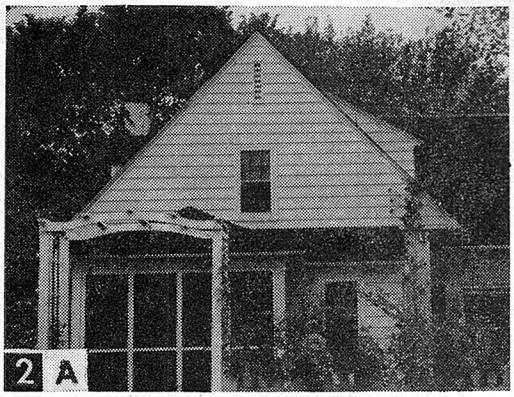
CONVERT YOUR GARAGE To Living Space

Preliminary planning to get what you want; how to strip down the garage, figure rough openings, cut plaster walls, install rough framing

By MARV M. FRYDENLUND

WANT another room in your house which will be secluded, yet more convenient to reach than your basement or attic? You can get it in your garage, if it's the attached type or an integral part of the house, at far less cost than construction of an addition.

When Shurtleff Lumber Co. president Quentin R. Paulson of Barrington, Ill., yielded to the wishes of his wife and himself to convert their one-car garage (Fig. 1B) into a comfortable, informal study-room (Fig. 1A),



Back view of home before and after the transformation. Project is equally practical where garage has front or side opening. Part of new two-car garage can be seen at right.

their home plan proved to be ideal for the purpose (Fig. 3B and C). The rear-entry garage (Fig. 2A) adjoined the center hall. Its size—common when the house was built 24 years ago—was small for today's longer, wider cars but adequate for the new room wanted.

Paulson knitted the family room, a new two-car detached garage, patio and landscaping into one coordinated job which ran costs up considerably. But he figures the extra 180 sq. ft. of living space and the greater convenience of a double garage more than offset the expense in enhanced house value. For economy reasons, you can spread out the work in separate projects. One or more might be eliminated, or at least deferred. Additional savings depend on your choice of finish materials, etc., extent of cabinetry.

As you might expect, the Paulsons featured wood: natural-finish Colonial willow paneling, plank flooring, paneled and louvered doors, built-up ceiling beams, room-width valances for cove lighting, built-in storage cabinets and bookcases.

The overhead garage door gave way to a picture window and Dutch door forming the rear wall of the new family room (Figs, 2B and 4). With the back door they overlook the patio and a landscaped flower garden planted between the house and the new garage. Main entry to the family room was gained by knocking out the back wall of the original, oversize guest closet off the center hall. This split the old closet into three parts; a passageway flanked by two shallow coat closets.

Preliminary Planning is by far the most important step in converting a garage to a family room or other living space. Take time to orient the new room to the rest of the house and the outdoors so it will best serve its intended purpose.

First measure your garage space and, at least, those rooms adjacent to it. Jot your measurements on a rough sketch as you go along, including exact location and size of all existing windows and doors. If you have or can get a copy of the original plans of your home, you will be spared this work. Even so, check actual measurements against those on the plan—there may be some deviation.

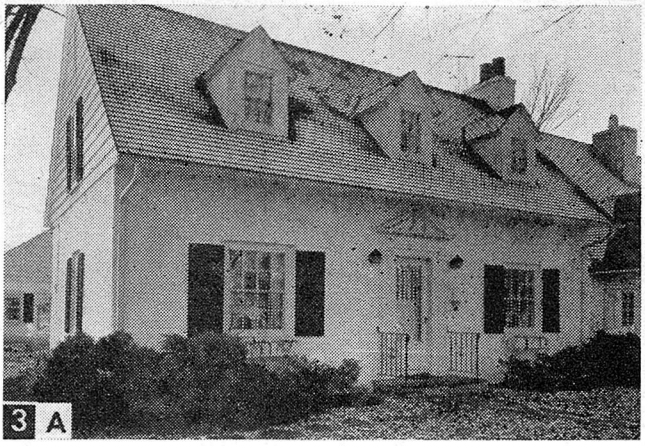
Now transfer your measurements to a scale plan, using graph or plain paper. If the latter, scale your drawing to ¼ in. per foot of actual measurement. When the scale plan is finished—and it need only be accurate, not well drawn—study it in relation to the way you live in your house now and the extra space and conveniences you want. Ask these questions:

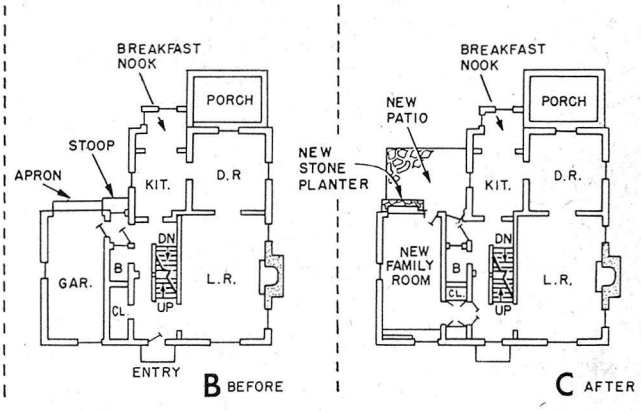
1. How can the extra space fit into what will actually be a larger house than you now have?
2. Where should the room be entered? Should it be a dead end in the house traffic pattern or will the room's function be such that through traffic won't disturb activities within the room?
3. Should there be an outside entrance?
4. Are present windows adequate or should they be enlarged for a better view and to admit more light?
5. Should the garage door be replaced with a bank of windows, view window, floor-to-ceiling glass or sliding doors?
6. How many and what kind of built-in storage units do you want?
7. Where will you need electrical outlets—for reading, TV, projector, etc.?

When considering these, study your plan to see if some storage units you need for activities can be located outside the new room in existing closet, hall or other space. Trace your first drawing and then sketch in the additions and changes you envision.

As your plans take shape, transfer them into full scale by marking locations of new doors, built-ins, windows, electrical outlets and other additions on floor and walls. "Use" the garage as a family room by walking around in it as if the conversion had already

Front appearance of Paulson home was unchanged. Window at left formerly served as effective camouflage for garage; now is part of cabinet wall in new family room.





been made to get the feel of the room and can determine further changes. Put them in your scale plan and you'll be as certain as possible that the finished project will enhance your living and value of the house.

Now you're ready to take your plans and sketches to dealers for material quotations, schedule labor you may need in addition to your own, arrange for financing if desired—and start work. Illustrations on these pages follow the Paulson project, typical because door, window, floor, wall, ceiling and closet changes were made, built-ins added and heating and wiring extended. You may apply many details to your own projects.

Stripping Down the Garage. Rebuilding will be easier if you take away at one time all parts not included in the new use. To remove an overhead-type garage door, release and detach springs first; brace door temporarily while you detach and remove tracks, then dismantle door panel by panel.

If hinged passage doors are to be re-used along with original casing and trim, remove them this way: Take out hinge bolts to detach doors. Carefully pry loose trim molding on each side, using a putty knife first and then a wide-blade chisel with a wood block as a fulcrum. (Pry up and remove threshold—if outside door). Insert a hacksaw between door jambs and wall studs to cut all nails holding the frame, then wiggle the entire door frame out intact if you can—with hinges and striker plate attached.

To remove a window intact, pry off interior trim first, then either cut the casing nails or knock them all the way through the frame with a hammer and a slender nailset. The window will most likely pull along, still in the frame, as you pry exterior molding away from wall sheathing.

Carefully pry off all other trim and molding pieces you plan to re-use and store them safely.

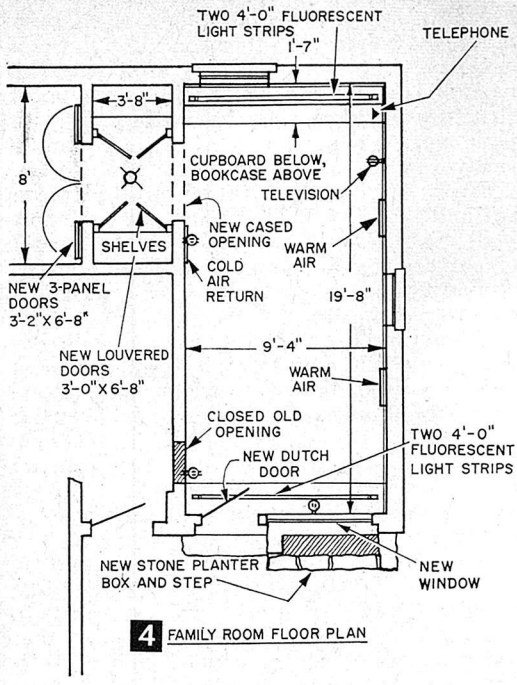
In the Paulson garage, a ceiling light was removed, and switch, wires and ceiling box pulled out for re-use. The remaining opening was closed and replastered. If you do such removal yourself, trace the hot wire to its origin at fuse or circuit breaker box, or junction box; then pull main switch and detach the wire at the power source *before* touching work to be removed.

Finally, break up and remove the concrete apron or sloped slab at the garage door. Use a cold chisel and heavy hammer to score concrete in sections small enough to lift and cart away. Break slab at score marks with a heavier sledge. You may have to dig under the slab. Concrete has tremendous impact (straight down) resistance, but very little resistance to being broken off—like a cookie.

Rough Framing. When you select doors and windows, obtain dimensions for the rough openings from the dealer. This is important; measurements of finished frames to be inserted into the openings often differ a little from those specified in plans.

If garage side of walls is unfinished, you'll have little difficulty cutting and framing openings. If walls are finished and plastered like Paulson's, more work is involved. Here's the procedure he used to cut and frame the double-door opening from front hall into the new family room (Fig. 4):

Determine exact location of door on house side of the wall. Mark on wall the center of proposed door, then measure out and mark opening to be cut, using this formula:



4 FAMILY ROOM FLOOR PLAN

Width of door	
(two used, 1 ft. 8 in. each)	3 ft. 2 in.
Thickness of door frame	
side jambs (¾ in. each)	1½ in.
⅜ in. "wiggle room" on each side so frame will slip easily into rough opening (space to be shimmed later using ⅜-in. lath)	¾ in.
Total width	3 ft. 4¼ in.

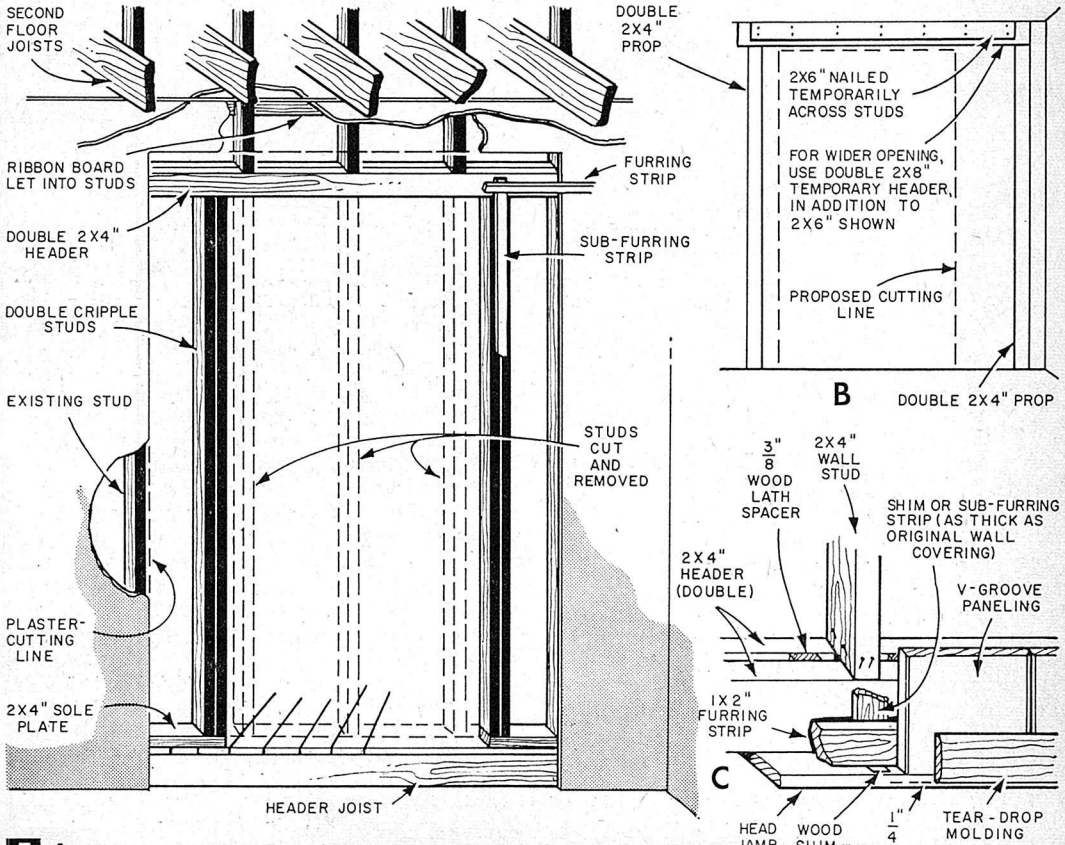
Measure half the total from each side of your previous center mark and mark vertical cutting lines. Add these items to determine height at which to cut plaster:

Height of standard door	6 ft. 8 in.
Head jamb thickness (standard)	¾ in.
Top wiggle room (shimmed later)	⅜ in.
Total height	6 ft. 9⅛ in.

Cut the opening in plaster or other wall covering carefully, avoiding wall studs and any wiring or piping inside the wall. Try to avoid jagged edges so that molding to be applied will cover without need for patching.

For the fastest way to cut, use a portable power saw with guide set to exactly the depth of plaster plus lath. Unless you use a special hard material-cutting blade, sharpen up the blade a bit after cutting.

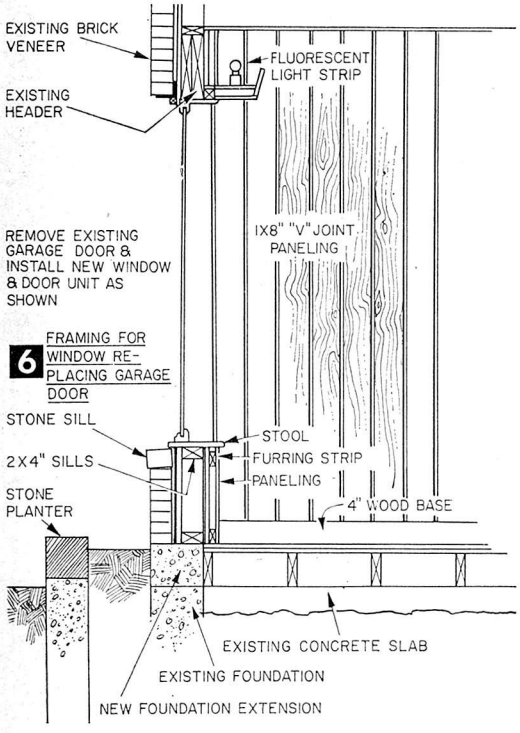
If you use an ordinary saw (it may also



5 A CUTTING AND FRAMING FOR ROUGH OPENING

need sharpening afterward), begin by boring a hole in each upper corner of the proposed opening. After starting cut with a keyhole saw, you can switch to an ordinary crosscut saw. Take short strokes until you have cut enough to break away plaster and search the wall cavity for piping or wiring.

Opening on garage side of the wall cannot be cut to exact size since you need room to cut existing studs and insert new rough framing. So cut out the plaster beyond sides of the proposed rough opening to the next wall stud as in Fig. 5A. To determine height of the plaster cut on this side, use the formula



previously mentioned but add depth of the header. In Paulson's case, a double 2 x 4 header was sufficient for the 3 ft. 2 in. finished opening width so 3⅝ in. (actual width of a 2 x 4) was added to the formula, giving a height of 7 ft. ¾ in.

If your span exceeds 3 ft. 2 in. in a load-bearing wall of a two-story house, however, use a double 2 x 6 header up to 5 ft. width. If opening is still wider, ask your dealer, an architect or engineer to compute the size for you. For each increase in width of the header (over a 2 x 4), plan to cut the studs that much higher.

After cutting away plaster, nail blocks to studs as bases for the shimming. Brace studs to be cut by temporarily nailing a 2 x 6 across them right over the cutting mark as in Fig. 5B. Use 16d nails but do not drive them all the way "home" so that you can pull them out later with the claw of a crowbar. The nails will hold studs firmly and help support structure above during the cutting. If it's a wide opening, prop up the ceiling temporarily on both sides of the wall as in Fig. 5B.

Figure 5A shows how three wall studs were cut and header installed. Next, cut the sole plate (horizontal 2 x 4 on which studs rest) to correct rough opening width and install double cripple studs to serve as permanent rests for the header.

If you plan to retain the original wall covering, you will need to replaster any broken wall area back to the rough opening. However, since Paulson planned to panel over the old wall, he merely shimmed out the new framing to the thickness of the original plaster as in Fig. 5C so that furring strips for the paneling had a level nailing base.

Cut window openings the same way, except that you figure from the top down. Obtain overall sash and rough opening sizes from the dealer, then mark wall at height to correspond with top edge of door trim so that window will finish at equal height. Work down from that mark, using details provided by the manufacturer to determine where to cut plaster and studs to insert the header. Locate lower edge of header, then measure rough opening height downward from that to locate top edge of the 2 x 4 sill, as in Fig. 6.

Replacing Garage Door Opening. When filling in the garage door space, such as with the Paulson window and door combination, much work is already done because of the header spanning the existing opening. Rough framing consists of a 2 x 4 sill or sole plate (sill rests directly on the foundation; a sole plate on the floor or subfloor), cripple studs, window sill and furring. If header is too high, as with an 8-ft. high garage door, either fur down from it or install a false header below it.

Note in Fig. 6 that Paulson poured an extension to the concrete foundation. Building codes permitting, you could instead lay the wood sill on the existing foundation, frame up to the window opening, and then cover outside of the framing up to 6 in. above grade with moisture-resistant fiberboard—the kind used to insulate the perimeter of slab-built houses. If you do this, use treated lumber to forestall moisture troubles.

To close up an existing door opening, Paulson simply filled in 2 x 4 framing, added insulation where needed and installed a wall covering furred out to a thickness equal to the adjoining cover. You can reframe such an opening with two studs and the necessary length of sole plate as in Fig. 5A.

You are now ready to complete the basic conversion of an integrally attached garage to a family room.

Only the front window was left undisturbed in front half of the room which had formerly served as the back end of a rear-opening garage (right). Framing and decorating techniques make window appear wider. Flooring is 7⅜ in. over old concrete to match first floor level.

How to prepare the subflooring, add to heating and wiring, install new windows and doors, panel walls, make false ceiling beams, apply finish floor

WHEN all openings in your former garage space have been relocated and rough-framed where you want them in the new room, your next step is to prepare for the flooring.

Installing Subflooring. Once you decide on the surface, consider the installation problems involved. Three conditions that may cause extra work are excessive unevenness in the concrete garage floor; difficulty in matching height of the proposed new floor to that already existing in the house, and possible need to pass heating or plumbing under the floor.

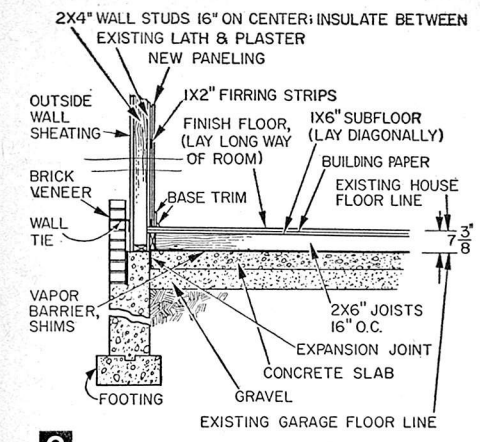
To determine the variation in height between the two floors, extend a carpenter's level from the edge of the house floor at the inside entry and measure distance from lower floor up to the level. This difference was 7⅜ in. in the Barrington, Ill., home of Quentin R. Paulson (Figs. 7 and 8), so he planned to make it up as in Fig. 9 with 2 x 6 joists (dressed depth 5⅝ in.), hemlock subflooring ¾ in. thick and prefinished oak flooring, also ¾ in. thick.

The total 7⅛-in. height was still ¼ in. short. A fraction of the difference was taken up by a vapor barrier of 90-lb. asphalt roll roofing installed over the concrete and building paper over the subfloor. Cedar shingles shimmed as needed under the joists took care of the remaining space.

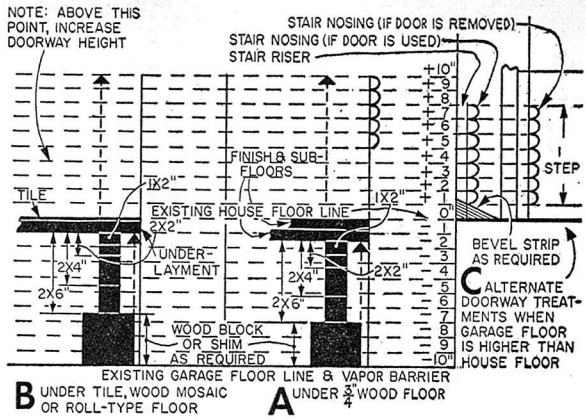
You might use polyethylene film as a vapor barrier and choose between 15-lb. felt and red resin paper for the building paper—or omit it altogether—over the subfloor.

Alternate methods to suit various floor heights and types are shown in Fig. 10. When using 2 x 4 or larger joists on the garage floor, compensate for any unevenness by cutting shims or wood blocks of varying thickness, as required. Wood blocks spaced 6 ft. apart under 2 x 6 joists (or 4 ft. under 2 x 4's) are more economical than larger joists.

If space limits you to 2 x 2's, 1 x 2's or other small-size screeds which can't bear weight over a span, plane the screeds to varying thicknesses or level off the concrete. The latter course is usually easiest and is required when subflooring, underlayment or tile is laid directly on concrete. Resin bonding agents



9 FLOOR CONSTRUCTION



10 SUBFLOOR VARIATIONS

for such work are made by a number of companies, including Permagile Corp. of America, 34-43 56th St., Woodside 77, N. Y.; Furane Plastics Inc., 4516 Brazil St., Los Angeles 39, Calif.; Sika Chemical Corp., 37 Gregory Ave., Passaic, N. J., and Camp Co. Inc., 9300 S. Sangamon, Chicago 20, Ill.

First spread a coating of the concrete-to-concrete adhesive over the floor. Then immediately pour a mixture of 1 part cement to 3 parts sand, plus water, over the slab to even it. Trowel this grout mixture as you would concrete. If your floor requires a large amount of this mixture, buy it from a ready-mix concrete plant—also the most likely local source of the special adhesive.

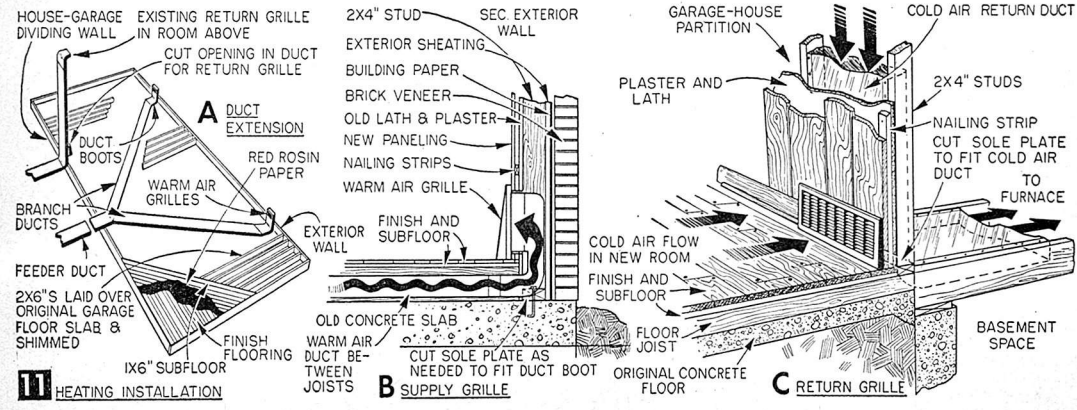
If the drop to the concrete floor is less than 1½ in., a new wood floor surface on it will rise above the house floor (Fig. 10A); if the drop is less than ¾ in., the same condition will occur when installing flooring as in Fig. 10B. A beveled strip will compensate for the height variation up to 1½ in., but beyond that install a stair tread, as in Fig. 10C.

When a new wood floor will be level with or higher than the house floor, you can save some money by substituting 1 x 2-in. furring strips spaced at 12-in. intervals, for subflooring—provided the concrete is level.

If you're using tile as in Fig. 10B and the drop to the concrete floor is less than ¾ in., you can make the floors come out even with thinner underlayment. Plywood, hardboard or particle board of any thickness can be laid directly on concrete above grades, but must be at least ⅝-inch thick when laid over a span.

When garage and house floors are level or the garage floor is higher, lay the tile in mastic spread over the concrete. If this installation is to be below grade (ground surface at point where it touches the building foundation), use asphalt or vinyl-asbestos tiles. Rubber and cork may be used on or above grade; linoleum above grade only.

Heating Addition. The existing forced warm air heating system in the Paulson home was adequate to include the new room. An opening was cut in the furnace plenum, or heat chamber, for a feeder duct carrying to the wall between house and garage (Fig. 11). This was continued to new outlets installed as in Fig. 11B. Duct boots extended out from the wall about 1¼ in. so grilles were mounted



11 HEATING INSTALLATION

outside the paneling. The cold air return was cut into a return duct (Fig. 11C), previously installed to serve the room above.

This is modern perimeter (outside wall) heating. A thermostat in the new room regulates the temperature.

When there's no duct room under the floor, you can install warm air outlets along an interior wall and depend on the nearest existing cold air return to create some air circulation. This is not as good an air movement pattern, but gives satisfactory results when laid out by a competent installer.

With hot-water or steam heat, pipes or tubing can be run under the floor or let into the wall. In Paulson's case, chopping a channel in the existing plaster would, with furring strips, provide enough space behind new paneling for pipes up to 1½ in. O.D.

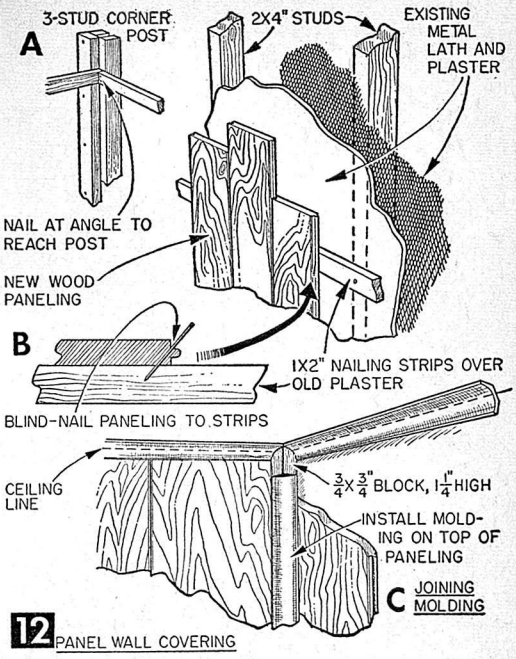
If you have an older gravity hot-water system, talk to a dealer or engineer about possibilities of converting it to use modern baseboard radiators or convectors in the room.

Windows, Door Frames. If re-installing any doors or windows, merely reverse the removal procedure described earlier on page 80 under "Stripping Down the Garage." New windows usually come complete with frame. Many may be bought knocked-down at a slight saving. If you do this, be sure to obtain manufacturer's instructions for assembly.

To install a complete, in-the-frame window, tack bracing diagonally across the unit to hold it square while placing and nailing in the opening. Shim the unit to plumb with shingle strips, then nail through the exterior molding into sheathing and wall studs. When installing window in a new rough opening, tack an 8-in. strip of waterproof building paper around opening over the sheathing. Take time to pack insulation in frame-to-rough-opening joint to make it airtight.

Unless you can buy windows with frames of correct width, fur out each frame so it will be flush with adjoining paneling. You can do this right away by holding a piece of paneling over a furring strip and measuring the distance to frame edge, or you can defer the job until paneling is in place and avoid trouble with high points in the paneling.

To re-install a door frame, it must be similarly furred out—on the edge opposite the door, since door is mounted flush with paneling. It's preferable to build new frames—out of the same wood as the paneling or ¾-in. clear pine. Rip boards to the new wall thickness. Rout the head or top jamb ⅜ in. into side jambs and fasten with 8*d* box nails. Saw off side jamb extensions above head jamb as required to insert frame in rough opening. Plumb frame with a level, insert ⅜-in. shims (or single strips) each side and nail through jambs into cripple studs, using 8*d* finishing nails. Set nails.



12 PANEL WALL COVERING

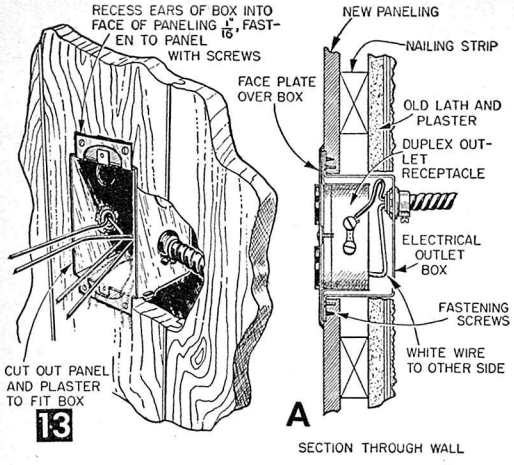
Furring the Walls. To prepare for paneling, nail 1 x 2 furring strips over shims where the plaster had already been removed as in Fig. 5. Also, nail the strips horizontally around the room, directly over the existing plaster and with a maximum 24-in. spacing. Use 10*d* resin-coated box nails, which will extend into the studs and hold well.

Stop strips flush with the rough framing at openings and butt-join them at corners, as in Fig. 12A. If necessary, pre-drill nail holes at an angle and use long nails to reach the corner stud. If plaster is very uneven, shim low spots with shingles. Don't worry about slight unevenness—it will be undetectible after paneling is applied.

Adding to Wiring. This one-room electrical installation is quite simple, particularly if you have a spare circuit connection available in your fuse or circuit-breaker box. You need only extend this one circuit to the room and run wiring to the points where you will be installing outlet boxes (Fig. 13) right after adding the paneling.

If you wish you can attach furring strips at proper height, fasten the boxes to them so that they extend forward about ¾ in. and wire them right away. The plaster wall is cut out as necessary and paneling can be cut when installing the boxes. Cover plates on the boxes will hide the cut-outs.

You could also wire some outlets to the circuit which serviced the area when it was used as a garage. Trace the wiring back to the nearest junction box and start rewiring from there. Run all wiring in between furring strips and hold firmly in place with staples



long enough to go through the plaster into studs.

Caution: If you're not familiar with electrical wiring, either call in a licensed electrician or study thoroughly one of the many texts dealing with home wiring procedures. If you elect to handle the work yourself, be sure to abide by your local building code. Most codes require your work to pass professional inspection before granting the approval required by fire insurance companies.

Applying the Paneling. Paulson used pre-finished, ¾-in. Colonial willow boards as in Fig. 14. They come in random widths and lengths 100 sq. ft. to the carton, with both sides and ends having tongue-and-groove edges. The paneling makes up various 8-ft.-long combinations so, for best results, lay it out on the floor first and try different arrangements for the random effect most pleasing to your eye.

You can start at any corner with the groove side of the first panel against it. Blind-nail through the tongue at an angle with a 5*d* finishing nail at each furring strip, as in Fig. 12B. You need not pre-drill the wood, as it resists splitting well except when very close to an end. Within 2 ft. of the next corner, measure out a combination of panel widths to help you reach it without need for ripping a panel and wasting material.

If you prefer the effect, rip off the bevel on the V-joint when you start the first panel on the next wall. Paulson first nailed cove molding in the corners, butting the paneling against it for a different effect than that of plain butt joints. His one knotty problem—joining vertical molding to the two pieces of ceiling molding—was solved by installing a small block as in Fig. 12C.

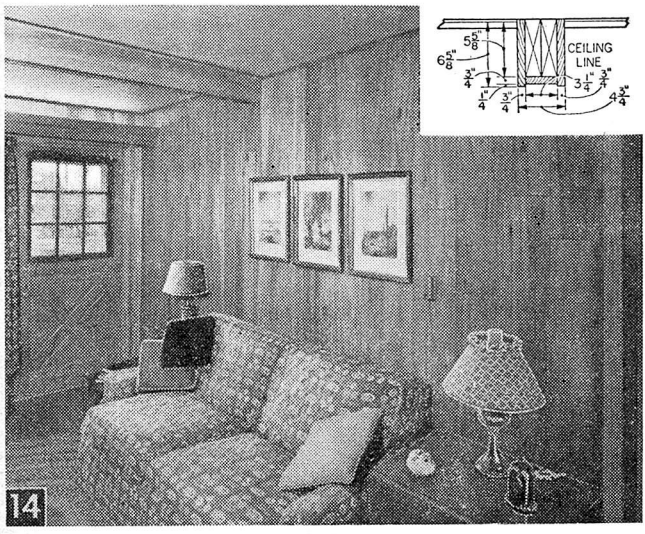
Be sure to panel close enough to door and window jambs for trim to lap at least ½ in. over the paneling.

False Ceiling Beams. For a rustic touch, Paulson ran three equally-spaced false beams the short way of the ceiling. Non-load-bearing, they were made by encasing two 2 x 6's in willow boards as in Fig. 14 (see insert). To do this, chisel holes in the walls at point where beams are to rest, then nail 1 x 4's across the plaster and into wall studs for additional furring under the paneling. When 2 x 6's are in place, attach willow casing with 6*d* finishing nails and set heads below surface.

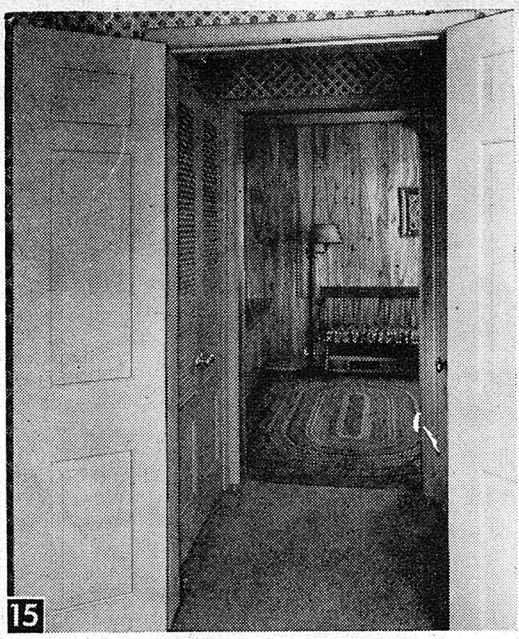
Finish Flooring. The Paulsons chose *Bruce Ranch Plank* flooring for their new family room. Comprising alternating oak strips of 2¼ and 3¼-in. widths with factory-inserted walnut pegs at ends, this pre-finished product is installed the same as regular strip flooring.

Before applying, store finish flooring in the room at least two days to adjust to humidity conditions. At this same time, you can prepare the subflooring by planing down any high spots, setting loose nails and sweeping clean. Lay the first strip at the doorway to match up with existing flooring. If other flooring ends with a tongue, slip the new grooved flooring over it. For joining groove-to-groove, fit a hardwood spline in both grooves. Now measure the width of the doorway. If the first full-length strip ends up about ½ in. from the paneled wall and perfectly parallel with it, you're in luck. If not, rip and re-groove one or more of the doorway pieces as required to compensate for the difference.

Nail through face of first strip in room with 8*d* flooring nails,



Long interior wall of vertical willow paneling and non-loadbearing, built-up beams add to a feeling of size and height. Valance lighting at each end of room is controlled by three-way switches at either door.



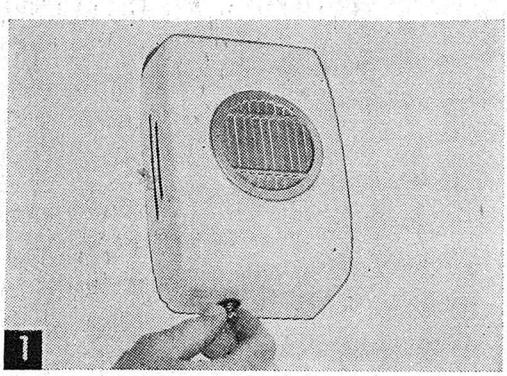
Inviting entry is off the front hall, where three-panel doors can make new room readily accessible to any other room or isolate it from the rest of the house. Hall connection was made by cutting through oversize guest closet. Pairs of louvered doors hide closet space still available.

spaced approximately a foot apart and close to the groove edge so that base trim will cover them. Also nail this strip and all subsequent strips through the tongue. Start nails where tongue joins the shoulder and drive inward angle of about 50° through floor and sub-floor into each floor joist. Also nail each piece within 2 in. of ends, pre-drilling holes to avoid splitting. It doesn't matter if joints don't occur over joists—spiral flooring nails will hold well in subflooring alone.

Fasten each board snugly, but not forcefully, against the previous one. Fit the groove of a piece of scrap flooring over the tongue of warped or stubborn strips to tap them into alignment with a hammer. Finish driving nails with a steel set to avoid hammer marks on the wood. Countersink the heads.

If necessary, rip the last strip to fit in place with just enough room for a thin length of scrap wood between it and the wall. Use scrap as a lever to hold strip snug as you face-nail strip close to edge. The nails will be covered by the base trim, which you are now ready to install, completing the basic garage conversion to your new room.

• The deluxe cabinetry shown in the Paulson family room pictures is the subject of the article on page 97: "For Your Study—Dressed-Up Storage Wall."

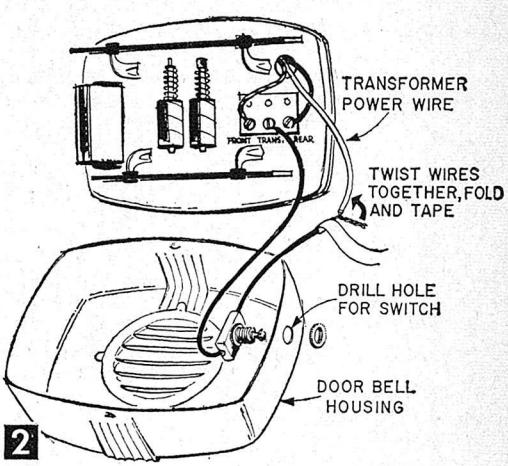


Door Bell Silencer

HERE'S a simple way of silencing that door bell so that it won't wake babies taking afternoon naps.

Obtain a small twist switch with threaded shaft and nut for mounting from your hardware store. Remove the cover or housing from your door bell and drill a hole through it large enough to pass the threaded shaft on the switch (Fig. 2). Make sure the switch parts inside the housing won't interfere with the bell mechanism.

Remove the wire coming from the bell



transformer from its terminal and connect one of the pigtail wires on the switch to the transformer terminal. Then connect the transformer wire to the other pigtail wire on the switch by twisting them together and taping.

You don't have to turn off the house current for this job—house bell circuits carry only 6 volts.

Replace bell housing, and have someone press door bell button so you will know if the switch is in the "on" or "off" position.

Plastic

Faced with a long-lasting wood-grained plastic laminate, this attractive lavatory provides drawer and shelf space for storing towels, wash cloths, and other bathroom necessities.

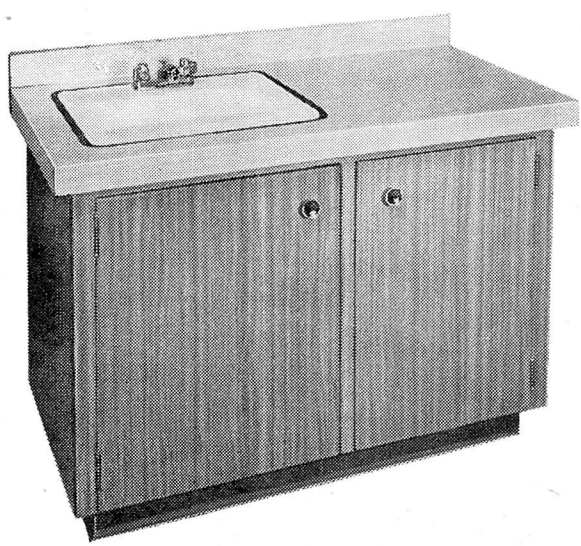
ADD a modern touch to your bathroom and increase linen storage space at the same time with a lavatory sheathed with a wear-resistant plastic laminate. The material is available in many warm-tone colors and in hardwood finishes so realistic that you can almost feel the wood grain.

The unit in Fig. 1 can be altered to fit around your present sink; or you can double the width to include two sinks (which is now a big selling point in new homes) and double the storage space.

While the well-known 1/16-in. laminate can be used, the more flexible 1/32-in. is satisfactory and not as expensive. The cabinet in Fig. 1 is two-toned, with the top in blond oak and the base a gray-brown mahogany.

Set to Work by cutting the 3/4- and 1/2-in. plywood panels (see Materials List) for the cabinet framework and counter top to dimension as in Fig. 2. It is best to lay out and cut each component separately so you can allow for cutting waste, and be sure that each piece is the size required for a given section.

When constructing the cabinet, turn the good side of the plywood in for the sides and bottoms and the best side out for the stiles and counter top. Make a 3/4 x 2 1/4-in. rabbet in one corner of the sides and center partition for the back rail (Fig. 2) so the splash panel of the counter top can fit in place smoothly.



Laminates Give New Look to Lavatories

Facing the lavatory cabinet with a plastic laminate lets you do the job with inexpensive grades of plywood

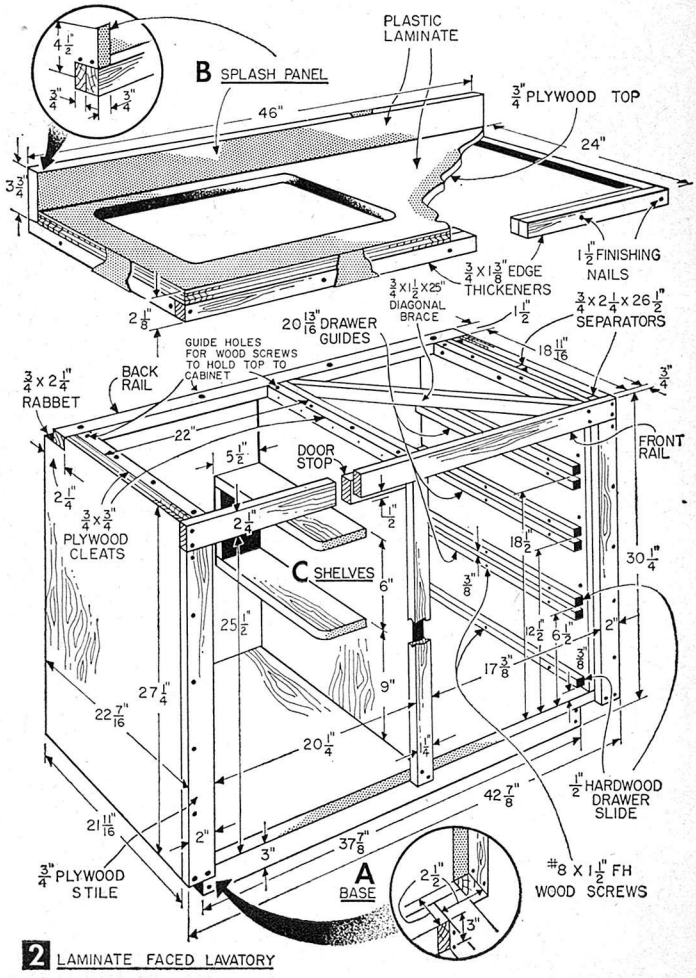
By EDWIN M. LOVE

After the rabbets are cut, glue and nail the sides and center partition to the bottom and install the front and back cross-rails. Square the assembly with a temporary brace that is tacked diagonally across the open back. Use 2-in. finishing nails to attach the stiles.

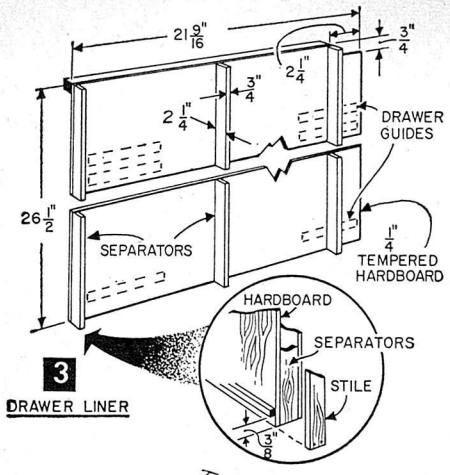
The cabinet rests on a base that is recessed 2½ in. from the sides and front (Fig. 2A). This base is made of ¾ x 3-in. plywood that is glued and nailed. Position the cabinet on the base and join the two units by driving nails through the bottom and into the base. Tip the cabinet on its back, brush contact cement on the base, and cover with rubber cove molding.

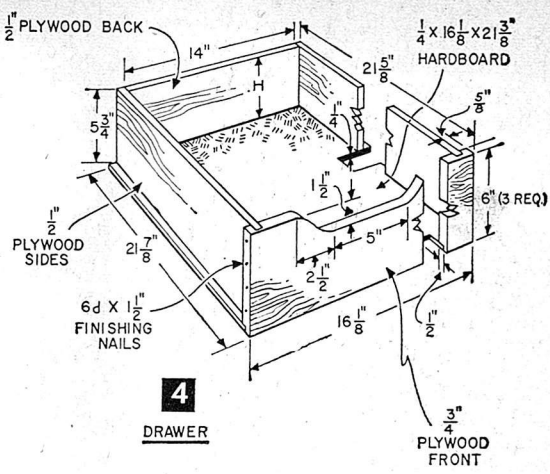
Install the Built-Out Liner (Fig. 3) on the right side of the drawer compartment so the drawers can be pulled out when the door is opened 90°. Use ¾ x 2¼-in. plywood separators to build-out the ¼-in. hardwood drawer liner from the side of the cabinet. Attach this liner section with glue and finishing nails, then screw the hardwood drawer slides to the liner and center partition with No. 8 wood screws as in Fig. 2C.

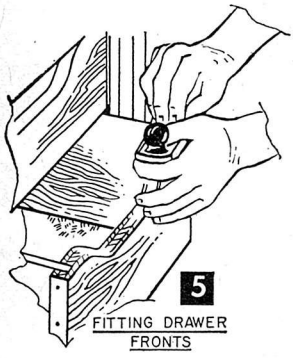
Nail the door stop (Fig. 2B) behind the front rail in the sink compartment so it projects below the rail by ½ in. The center stile is attached so it is flush with the right, or drawer compartment side of the center partition. Drill ⅛-in. guide holes in the cleats and glue and nail them to the top of

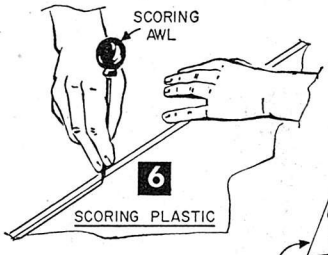


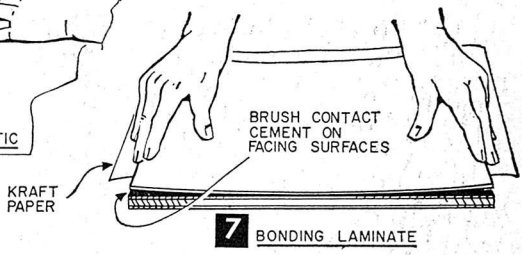
2 LAMINATE FACED LAVATORY











MATERIALS LIST—LAVATORY

No. Req.	Size and Description	Use
1	3/4" x 4 x 8' AD plywood	cabinet, counter top, drawer fronts
1 1/2	1/2 x 36 x 48" AD plywood	drawer sides and backs
2	1 x 2" x 8' pine or fir	edge thickeners
1	1/4 x 22 x 26 1/2" hardboard	drawer compartment liner
1	1/4 x 36 x 48" hardboard	drawer bottoms
14	1/2 x 1/2 x 20 3/16" hardwood	drawer guides
	1/32 x 30" x 12 1/2' plastic laminate	cabinet
	1/32 x 30 x 48" plastic laminate	counter top
1 1/2 qts.	Weldwood contact cement	bond laminate to cabinet
5 doz.	#8 x 1 1/2" fh wood screws	drawer guides, counter top, shelves
1/2 lb.	6d x 1 1/2" finishing nails	
1	20 x 17" flat-rim cast-iron enameled lavatory	
Misc.	round dish door pulls, loose-in brass cabinet butt hinges, bullet catches with brass strikes, inside corner irons	

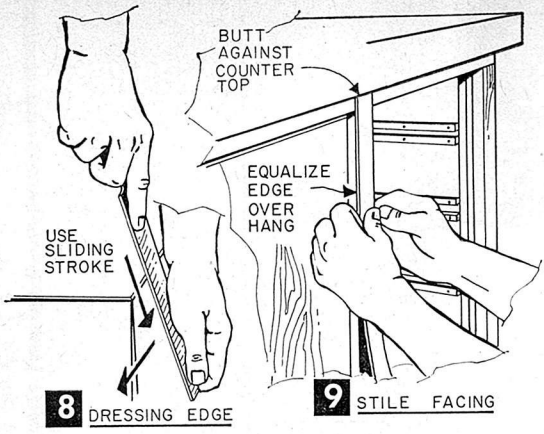
the sides and center panel. Add extra support by nailing a 3/4 x 1 1/2 x 25-in. diagonal brace across the top of the drawer compartment.

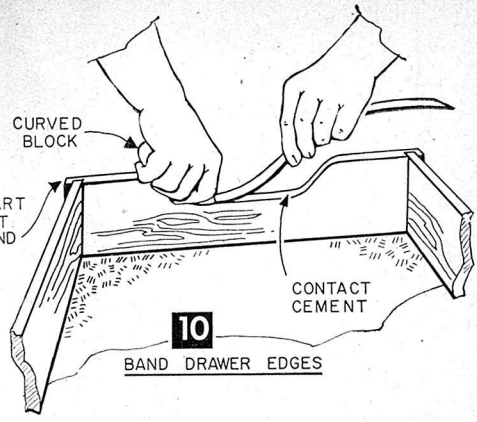
Go Over the Cabinet and set all the finishing nails since shrinkage might cause some nail heads to project and form lumps under the thin plastic wood or a mixture of sawdust and glue, and plane or file down any projections after the filler dries. Because of the uneven surface of the plywood, apply a coat of casein or urea glue and sand off any raised grain; a precaution that is required with any thin laminate that takes on the contour of the underlying surface.

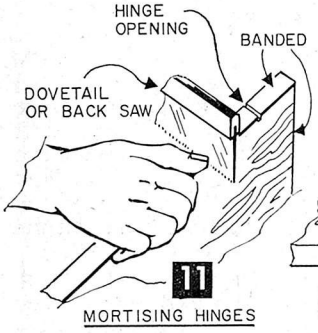
Cut the drawer fronts from 3/4-in. plywood. Three fronts are 6 in. high, and the one that fronts the bottom drawer is 6 1/2 in. high. Rabbet the bottom of the drawer front so the hardboard fits flush, then make 1/2 x 1/2-in. dado cuts 5/8 in. from the ends for the sides (Fig. 4). Jig or bandsaw the opening for the drawer pull recess. Assemble the drawer by nailing the sides to the back, and glue and nail the sides into the front dados. Use 3/4-in. brads and glue to attach the bottom to the front, sides, and back.

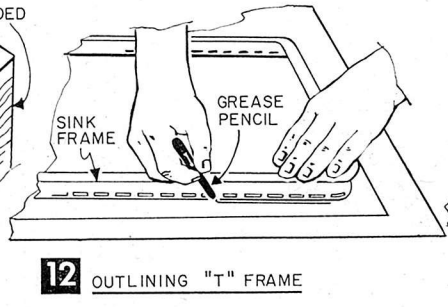
Fit the drawers by sliding the hardboard bottom into the 3/8-in. drawer slide opening and dress the upper edge so it slopes in slightly as in Fig. 5. There should be a 3/32-in. opening between the drawer fronts, allowing 1/32 in. for the plastic laminate and the rest for working clearance. Allow 1/16-in. clearance between the sides and hardboard sides so the drawers can slide easier.

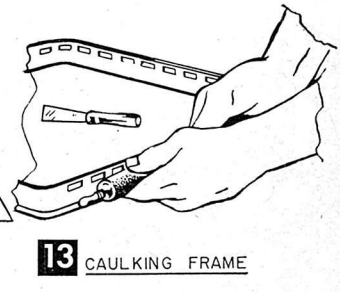
Flexible Plastic Laminate comes in roll form and is faced with a protective covering that should be left on until the cabinet is completely covered. Cut the large pieces











first, marking the dimensions with a grease pencil and scoring deeply (Fig. 6) with a sharp awl or a three-cornered file ground to a point. Guide the scoring tool with a straightedge. Narrow facings for stiles, and the edges of the doors and drawers, can be cut in ¾-in. bites with tin snips.

First step is to cover the sides of the cabinet. Put a protective mat, such as several newspapers or corrugated cardboard, so it butts against the side and stand the unit on end. Apply a thin coat of *Weldwood* contact cement over the entire side with a 2 in. paint brush. Lay the laminate face down on a clean surface and brush on a coat of contact cement. You might have to apply a second coat because the dry wood may absorb most of the first coat. Allow the adhesive to dry until paper pressed against it comes away without sticking.

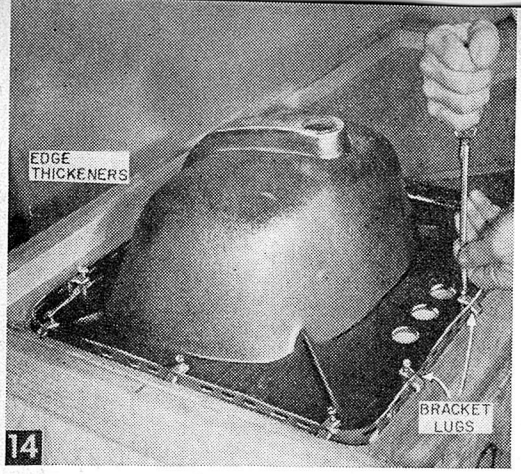
When applying the laminate, lay a sheet of kraft paper on the mastic-coated surface of the cabinet so it covers all but a 1-in. strip along the bottom as in Fig. 7. Keep the end of the facing over the exposed strip of adhesive slightly raised until the laminate projects evenly at the ends and edges. Press lightly in the center with your fingertips to adhere the two pieces, and rub along the edge from the center out to complete the bond. Lift the laminate just enough to withdraw the paper, then rub down, working back from the completed edge.

Flatten the Laminated Surface by starting at the center and, with a hammer and 1 x 2 x 8-in. block of wood to cushion the blows, pound the mastic coated surfaces together. Go over the laminate again, this time with the block set at a right angle to the first bonding position. By using this technique you are sure to get an even bond over the entire surface.

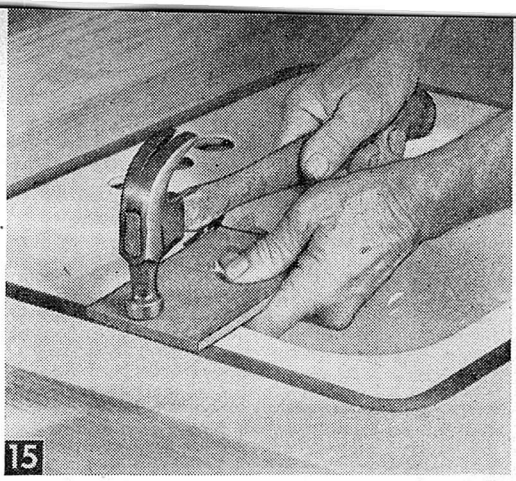
Trim the edges by first roughing down the overlap with a block plane that is nosed against the laminate to prevent it from chipping, following with a bastard file used in the same manner. Finish with a mill file, using a sliding stroke.

Where the laminate is being dressed to get a finished edge, such as at the bottom of the cabinet or where the sheet overlaps the edge on the counter top (Fig. 1), lean the file back to lightly bevel the overlay as in Fig. 8. Use care when finishing the edges, because one stroke too much or too deep in one place can cut through the pattern of the neighboring piece. Rub the excess contact cement off with your fingers or with a cloth moistened in lacquer thinner.

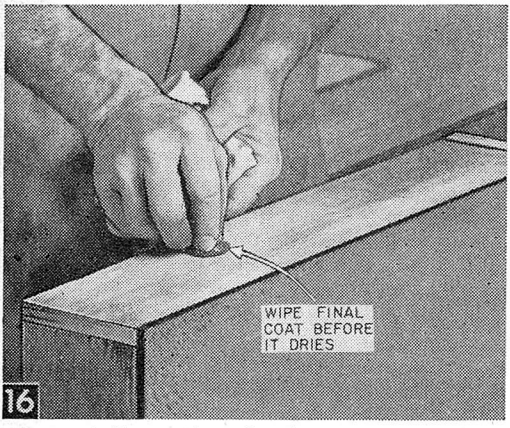
Stile Facings can be applied without a paper separator by holding the laminate strips as in Fig. 9 to equalize the edge over-



Installing the lavatory in this position makes it easy to insert, space, and tighten the hold-down brackets that secure the sink to the frame.



To make the frame fit flush with the plastic on the counter top, tap it down, wipe off the excess compound, and retighten the brackets.



Get grain-like streaks and a pleasing variety of light and dark areas by wiping the final coat of dark paint with a cloth.

hang. Extend the laminate that covers the center stile to the top of the cabinet. Bevel the ends of the 2½ x 20¼-in. and 2½ x 17⅜-in. laminate strips that cover the front rail between the center and side stiles. These beveled ends will slightly overlap the side and center stile vertical facing when they are pressed down and pounded in place. Be sure to lay the block over the joints and hammer to bring the strips flush.

Band the top edge of the drawers by applying contact cement to the facing surfaces and pressing the strip on the edge as in Fig. 10. Use a curved block when hammering the band into the recess, working from the center to the sides.

Cut the doors 1/16 in. smaller than the openings in Fig. 2. Leave the hinge edge square, but bevel the top edge 3° inward. Band the top and hinge edges, then mortise the hinge end with a back or dovetail saw as in Fig. 11. Chisel to the depth of the hinge and mortise the stiles. Cut the laminate ⅛ in. inside the hinge position marks and chisel the hinge opening to dimension. Hang the door and fit the lock edge, beveling it like the top, with a clearance of 3/32 in. between the door and center stile. Remove the door and band the hinge lock edges. Install a bullet catch at the top, then face the door fronts.

To Conserve Laminate, the inside of the doors can be faced with spliced pieces. You can put off this facing job until the rest of the cabinet is covered. This gives you more pieces to work with, and a better chance to match the pattern as closely as possible. Fit the joining pieces accurately and use the hammer and cushion block to bond the two contact coated surfaces.

Cut the edge thickeners to size and nail them to the front and sides of the ¾ x 24 x 46-in. plywood counter top. (Figs. 2, 12). Rabbet the ends of the splash panel (Fig. 2A) so it can fit between the side edge thickeners and into the ¾-in. opening between the back rail and the edge of the cabinet. Use glue and finishing nails to attach this panel to the counter top and back rail.

Adhere the 2⅛-in. wide strips of laminate to the thickeners, then face on the front and edges of the splash panel. When applying the laminate on the counter top, fit one edge tightly against the splash panel and use it as a stop when aligning the front and sides.

Directions for Installing the sink frame come with the lavatory. Position the frame (Fig. 12) so it is at least 2¼ in. from the front edge of the counter top, and trace around the frame with a grease pencil to outline the sink opening. Bore a corner starter hole and make the opening with a compass saw. Set this cut-out aside, because as you will use it later.

Turn the sink frame over and squeeze a bead of caulking compound along the lip as in Fig. 13 and flatten it with a putty knife. Insert the caulked frame into the opening and

turn the counter top so it lays face down on a protected surface.

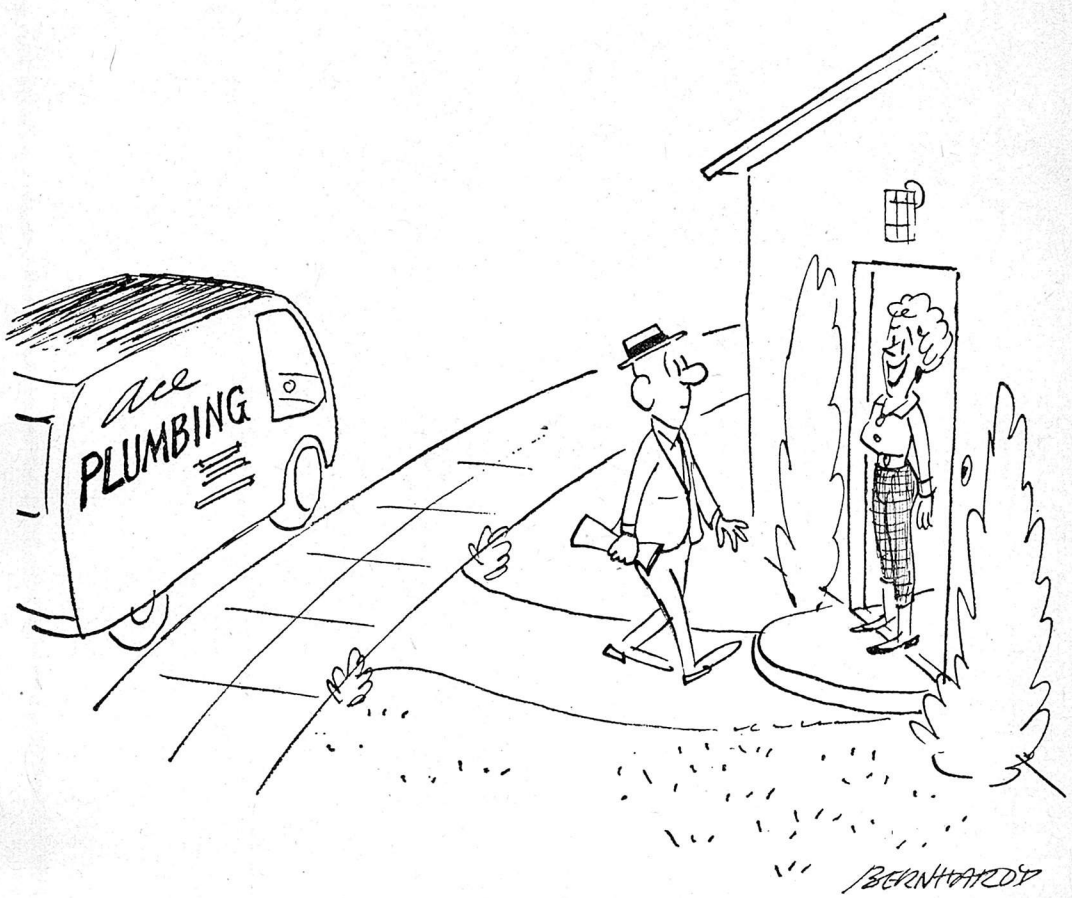
Set the sink on the frame (Fig. 14) and slip the aluminum bracket lugs through the corner slots in the frame from the inside with the ends bending toward the wood. Tighten the screws securely and set the center brackets. Evenly distribute any other brackets that are supplied. Have someone help you turn the counter top over and set it on the cabinet. Tap the frame rim as in Fig. 15 and wipe off the squeezed out caulking compound.

Make the Shelves for the lavatory compartment (Fig. 2C) from the piece cut out of the counter top. Rip in half and round the corners, and band the edges with plastic laminate. Attach the shelves to a ¾ x 5½ x 6-in. support block by nailing through the lower shelf and using ¼ in. dowels to join the top shelf. Make a hidden joint with the dowels by drilling ¼ x ½-in. holes in both pieces and gluing the dowels in the aligned openings. Drill ⅛-in. guide holes through the center partition and attach the shelves with 2-in. flathead wood screws.

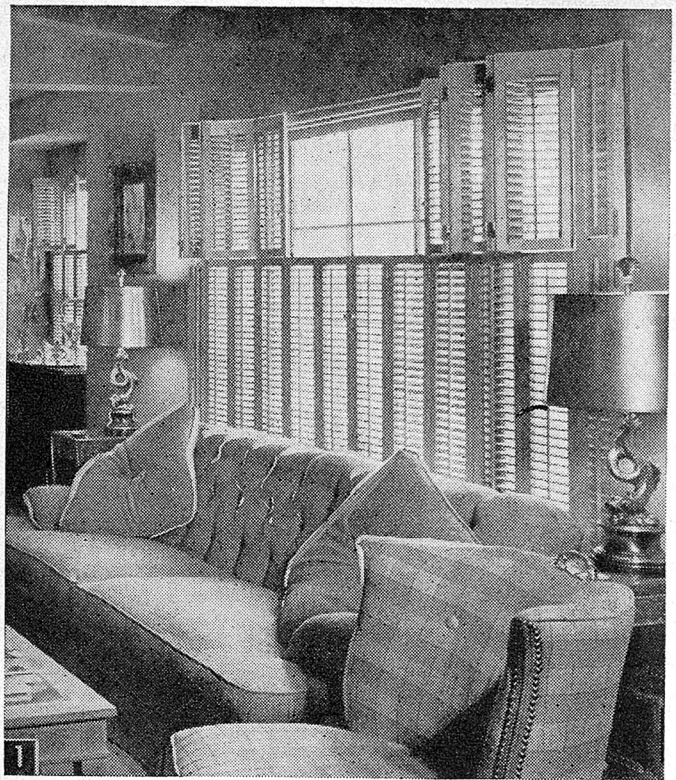
The drawer slides and interior of the sink compartment can be left unfinished, or coated with shellac or sealer. Another way you can finish off the sink compartment is to brush on sealer or a prime coat of paint, followed by a thin coat of ivory enamel. Sand lightly after each coat dries, then apply a coat of darker paint, such as redwood. Before this final coat dries, wipe it off with a cloth (Fig. 16) so the finish has light and dark areas.

Recess the screw in the door that covers the drawer compartment to prevent it from marring the drawer front behind it. Install bullet catches with solid brass strike plates at the top of the cabinet doors as in Fig. 1.

Set the lavatory against the wall and secure it in place with inside corner irons and screws that penetrate the studs, or with screw anchors that will hold it to wall board.



"I'm rearranging the bathroom."



Interior shutters add functional decoration to modern or traditional rooms. Dividing shutters into two panels provides ultimate in light and ventilation control.

Inside Jobs for
Home-Built Shutters

SHADES of Grandma! Movable shutters like those that gave her quick, facile light and ventilation control can easily be made and enjoyed by her grandsons and granddaughters (Fig. 1). Fashioned by you, the shutters will be less costly than commercial ones since they must be custom made or at least custom fitted no matter where they are obtained.

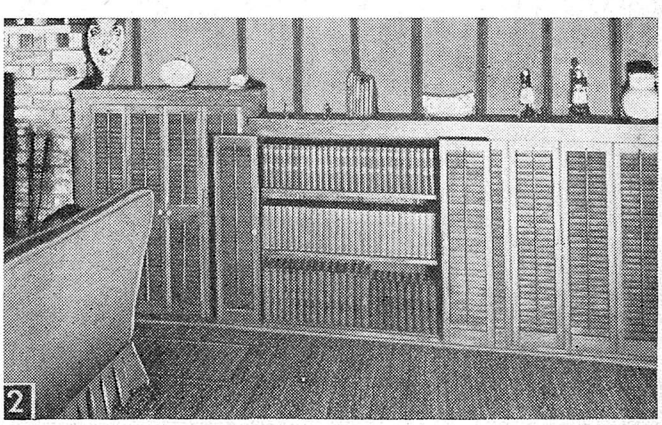
Windows are not the only places for shutters. Figure 3 shows them folded back from a pass-through opening. Shuttered bookcases (Fig. 2), can add a note of charm. Shutters can also cover a basement window or serve as a closet or rumpus room door.

Building and Fitting Your Own Shutters. Let's fit a window with shutters—either all the way to the top (Fig. 1) or only part way up from the bottom. First measure width of window between faces of casing (Fig. 4). Height runs from sill to face of upper casing and may be divided at any point, although the dividing line between upper and lower shutters usually looks best when lined up with meeting rails of a double-hung window.

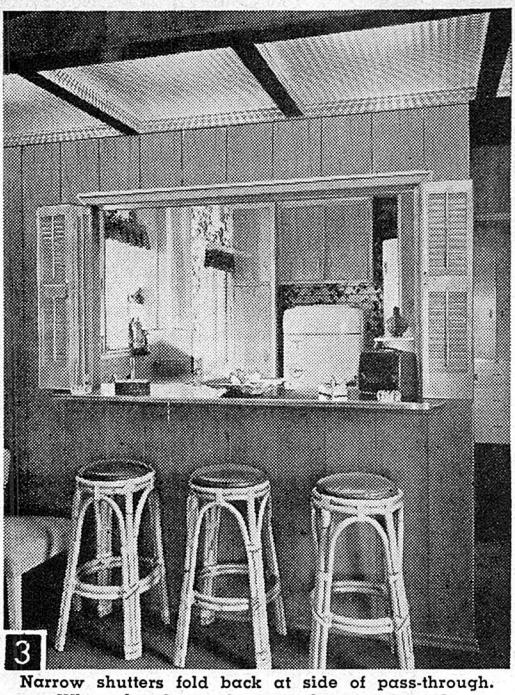
Divide the width of the opening into four equal parts. From the height measurement, figure how many vanes you'll need (Fig. 5A and B). Use sugar pine for shutters. Saw rails and stiles (two of each are needed for each of our four panels) from 1 x 6-in. stock (¾ x 5⅝ in.) and the vanes from 1⅛-in. thick stock. To make a bead (Fig. 5A) about 3/16 in. from outer edge of stiles, nick the front face with the table saw set at 45°, then sand corners round.

Cut the 1⅛-in. vane stock to lengths equal to A (Fig. 5A and C) less 1/32 in. for clearance. For uniformity, set a gage block on your table saw. Use a hollow-ground planer-type saw blade to minimize sanding. Next, locate and mark the centerline (Fig. 5C) down each end of each section for later location of nail pivots. Rip the vanes 3/16 in. thick.

Clamp the vane ends in a vise



Shutters neatly cover bookcases and blend in with room decor.

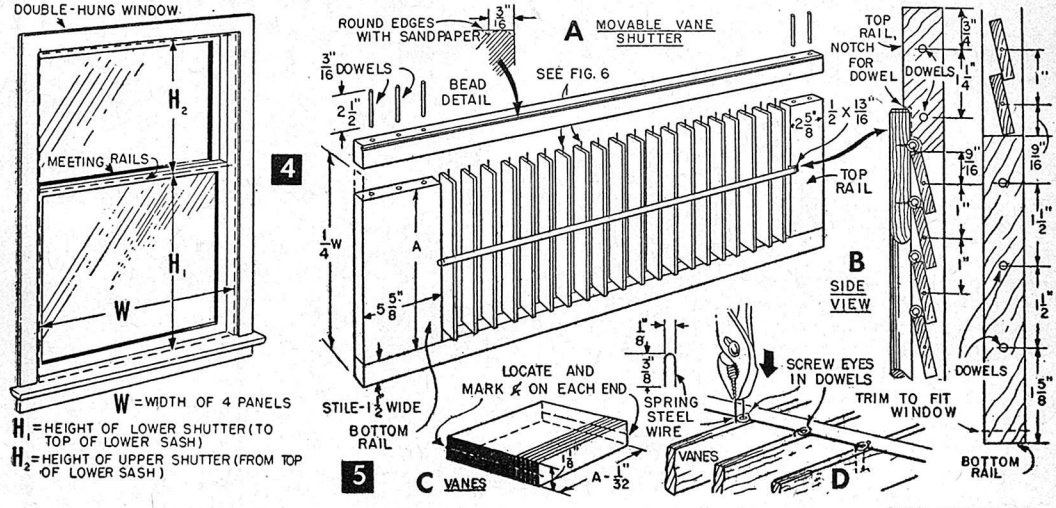


Narrow shutters fold back at side of pass-through. When closed, panels cover the pass-through.

el fasten the rails to one stile, forming a U-shaped frame (Fig. 5A). Insert vanes, then fit second stile over vane pivots. Align stiles to rails with an adjustable wood clamp (Fig. 8). Drill holes through stiles and ½-in. deep and 1½ in. apart into rails and glue 3/16-in. dia. dowels in place (Fig. 5A). Trim dowels flush with edge and plane smooth.

Use a 3/8-in. dia. soft wood dowel with chamfered ends for changing the pitch of the vanes (Fig. 5A and B). On a dowel as long as the distance between the bottom rail and the top rail, mark off spacing for the screw eyes (Fig. 5B) and drill pilot holes. Use small screw eyes, about 3/32 to ⅛-in. I.D. Try a picture-framing studio for these if your hardware store doesn't have them. Use a small center-punch or nail to help turn screw eyes.

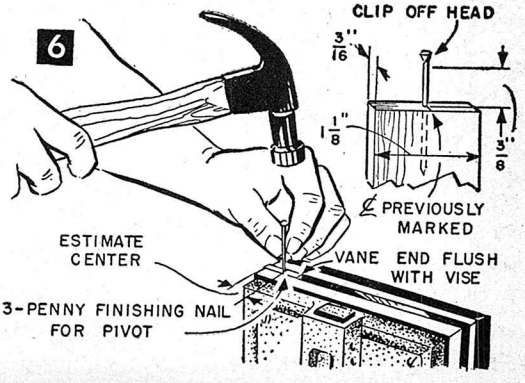
Next, staple the adjuster dowel into the vane edges (Fig. 5D). Cut #26 or 28 gage steel spring wire, available at hardware stores, into ¾ to ⅞-in. lengths and form them into staples. Ready-made staples that small are not generally available. Grasp each staple in turn in a pliers and press into the vane with one leg through the screw eye. When all vanes are attached, chisel out a pocket in the upper rail for the dowel end so vanes nest together for maximum shade (Fig. 5B).

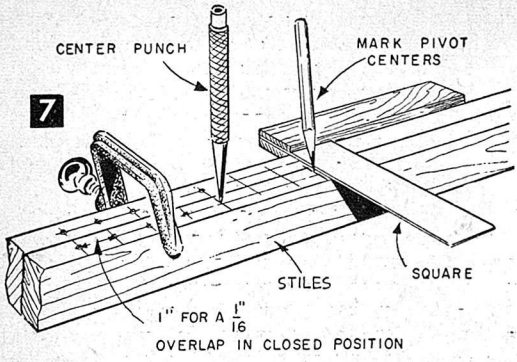


(Fig. 6), keeping the tops flush with the vise top to prevent splitting, then drive 3-penny finishing nails into the vane ends. Clip off the nail heads, leaving about 3/8 in. projecting for pivots.

After marking a centerline along the inside face of the stiles, clamp them together and mark pivot points across stiles (Fig. 7). Distance between bottom rail and first pivot and between top pivot and top rail should be 9/16 in. When pivots are spaced 1 in., vanes overlap 1/16 in. in closed position. Using a sharp (60° angle) center punch, mark pivot hole centers. Clamp a guide board or fence to the drill press table and drill 1/16-in. holes ½-in. deep at the marked centers.

Now, you're ready to assemble the parts. Dow-





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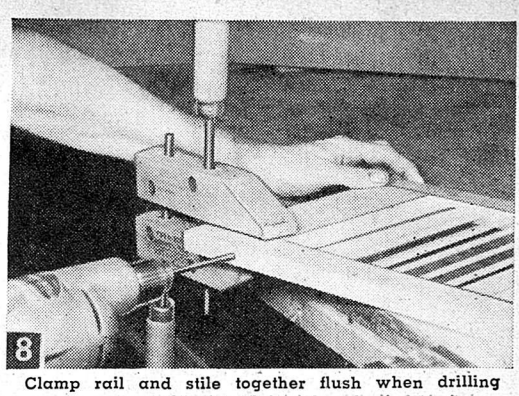
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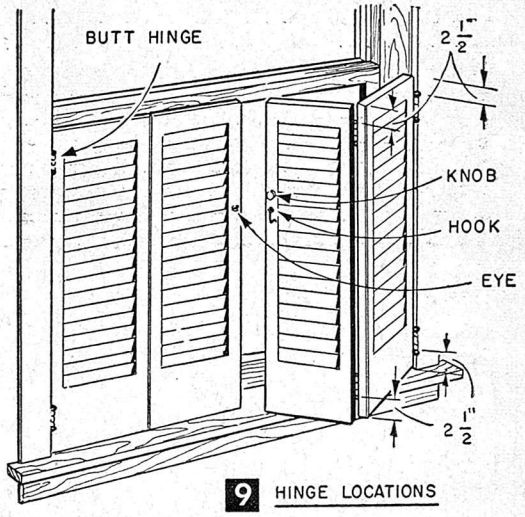
Clamp rail and stile together flush when drilling holes for gluing dowels.

Finishing Is Next. Sand the shutters, then spray them as desired. Or use a small brush plus a bit of patience.

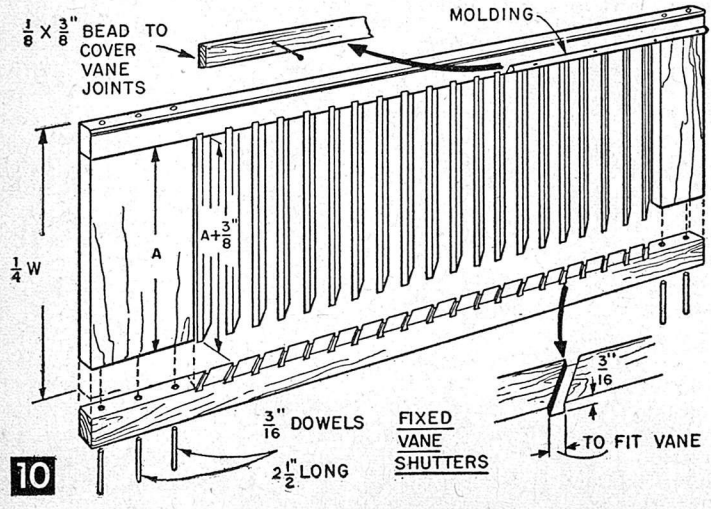
Use butt hinges to mount the shutters. To join panels of shutters along one side (Fig. 9), lay the two shutters face down and screw 2 x 2-in. butt hinges to the back near the top and bottom. If you use a three-panel section, or more, alternate the hinges on back and front so panels fold together accordion fashion.

Attach each group of panels to window casing by mortising hinges into edge of shutter stile and window frame. Set hinges out far enough so shutters fold back against trim molding around window, parallel with the face trim of window or door. Where shutter panels meet, attach knobs for swinging them open and a hook and eye across the opening to keep panels in a closed position (Fig. 9).



9 HINGE LOCATIONS

Fixed-Vane Shutters. Making vanes adjustable isn't necessary for some applications such as for closet doors or folding screens. For fixed-vane applications, measure shutters in the same way as for movable vane shutters (Fig. 4). Vanes, this time dimensioned A (Fig. 10) plus 3/8 in., fit into slanting slots cut in the inside faces of stiles instead of using pivots (Figs. 10 and 11). Because vanes are cut off at a 45° angle, they can be cut from the same stock as the shutter frames (Fig. 12). Fit a 1/8 x 3/8-in. bead molding along inner sides of stiles to cover notches (Fig. 10). Or, frame the entire shuttered opening in each panel with the molding. Hinge panels together and attach in window openings as shown in Fig. 9.—M. Dowd and David Swartwout.



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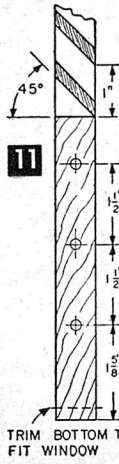

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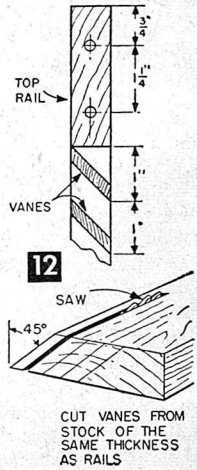

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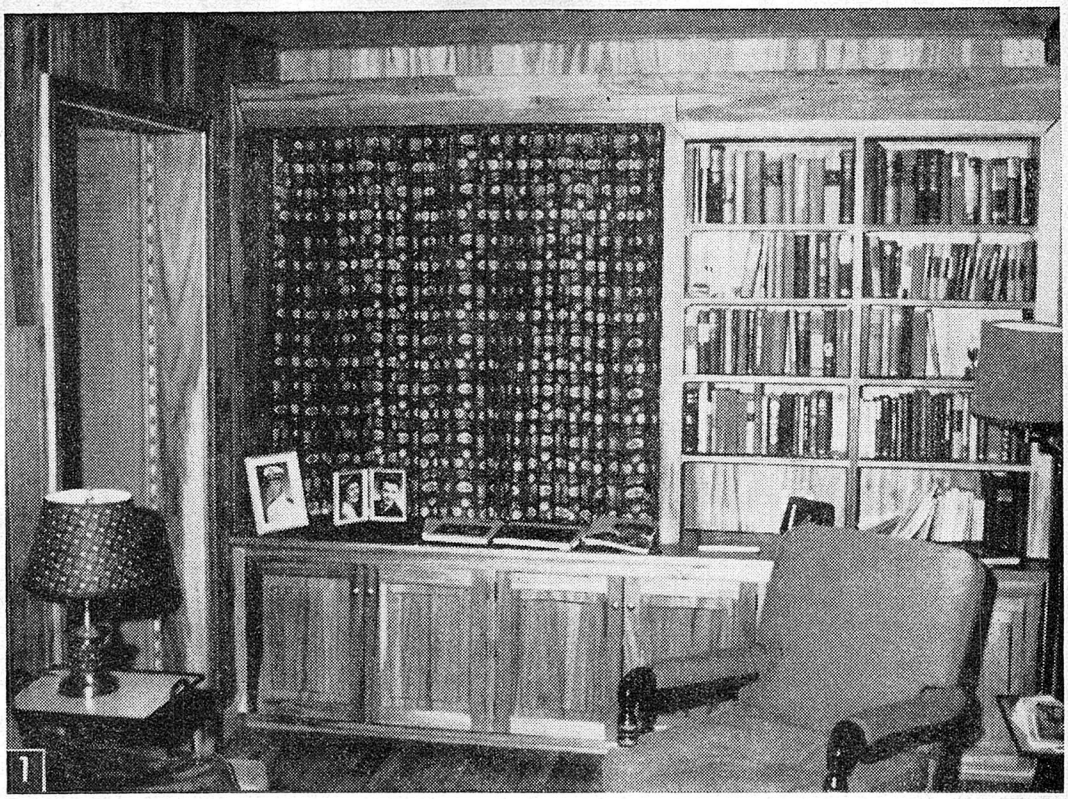


Wide countertop in front of window offers generous display area for family photos, albums, special books or favorite magazines.

For Your Study—

Dressed-Up Storage Wall

Keep the clutter at your fingertips in a handsome bookcase-cabinet unit with cove lighting overhead

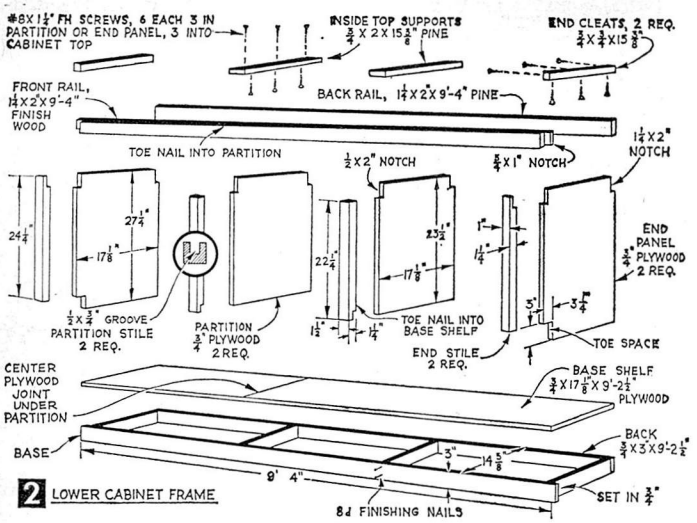
By MARV M. FRYDENLUND

THE myriad of things you want for paper work, reading or hobby will be kept handy, well displayed or hidden as you wish, by a storage wall in your study. By selecting wood to match the millwork, then shaping and finishing it to harmonize with your decorating style, your new built-in can rank with the finest furniture in the home.

If you have no study, you can create one economically by using the storage wall as a partial divider for a far corner of your living or family room. The back can be enclosed with matching paneling or plywood, or left open so the unit can be used from either side. In the latter event, install doors on each side and double the depth of the bookcase.

When Quentin R. Paulson transformed garage space in his Barrington, Ill., home to a willow-paneled family room-study ("Convert Your Garage to Living Space," on page 78 of this handbook), he added the storage wall shown in Fig. 1, using matching willow boards. He framed the bookcase the same as his windows and doors.

Willow is one of the softest of the hardwoods, also one of the easiest to work and glue. It's close-grained and presents an appearance which blends well with many other woods, since the color varies greatly from light gray to dark brown. If stained, it bears a remarkably close resemblance to the much more expensive walnut. Though not yet offered in all areas, it is becoming increasingly available in retail lumber yards, particularly in the Middle West and Mississippi Valley.



2 LOWER CABINET FRAME

MATERIALS LIST—STORAGE WALL

No. Req.	Size and Description
	Lower Cabinet (9′ 4″ wide)
7 pcs.	¾ x 7½″ x 10′ finish wood (cabinet top, base frame front, door frames, raised door panels)
1 pc.	1¼ x 2⅝″ x 10′ finish wood (front rail)
1 pc.	1¼ x 1⅝″ x 8′ finish wood (stiles)
1 pc.	¾ x 7½″ x 10′ pine (base framing, top supports, end cleats)
1 pc.	1¼ x 2⅝″ x 10′ pine (back rail)
1 pc.	¾″ x 4 x 8′ plywood } panels, partitions,
1 pc.	¾″ x 4 x 6′ plywood } base shelf, shelves
12 pcs.	24″ metal shelf standards with 12 shelf support clips to fit
9 prs.	cabinet butt hinges (3 to each pr. of doors)
24	#8 x 1¼″ *fh* screws (top supports, end cleats)
54	#8 x 1″ *fh* screws (hinges)
Misc.	6 brass knobs, 6 magnetic door catches, ¾″ and 1″ brads, 6*d* and 8*d* finishing nails, 4*d*, 6*d*, and 8*d* box nails, glue
	Bookcase (54″ wide)
6 pcs.	¾ x 9½″ x 7′ finish wood (top, vertical members, shelves)
1 pc.	¾ x 9½″ x 5′ pine (right side vertical, hidden against wall)
15 ft.	2¼″ teardrop molding
1 pc.	¾ x 2⅝ x 53″ finish wood (framing over top)
1 pc.	¾ x 2⅝ x 53″ pine (framing over top)
1 pc.	½ x 1 x 54″ finish wood (face strip)
8	48″ metal shelf standards, each with 4 shelf support clips to fit
Misc.	8*d* box nails, 8*d* finishing nails, 1″ and 1¼″ thick scrap for spacers, glue
	Lighting Valance (9′ 4″ wide)
3 pcs.	¾ x 7½″ x 10′ finish wood (butt-joined base, fascia board)
1 pc.	¾ x 2⅝″ x 9′ pine (backer boards)
2 pcs.	⅝ x 1 x 48″ metal strap (valance support brackets)
28	#12 x 1¾″ *fh* screws (brackets)
Misc.	4*d* and 8*d* box nails

You can make the unit in Fig. 1 in your workshop or build it in place, with necessary variations in details, type of wood and dimensions. Your choice of finish wood can be used throughout, but it will be more economical to use pine and plywood for the unexposed parts and cabinet interior members.

Building the Cabinet. Determine the width first to decide how many partitions you'll need. Each partition space should have a pair of doors for easy access and should not be much wider than 3 ft. so ¾-in. plywood shelves will support the storage load without **bowing.** When cabinet is 4 to 6 ft. wide, plan for 2 partitioned spaces and 4 doors (12 to 18 in. wide); for a 6 to 10-ft. cabinet, figure on 3 partitioned spaces and 6 doors.

Before cutting any cabinet pieces, check and modify dimensions in Fig. 2 to suit your space. Build the base first, using 8*d* finishing nails in front and 8*d* box nails elsewhere. Note that finish wood is used only in front, also that the back piece is 1½ in. shorter than the front due to position of end panels.

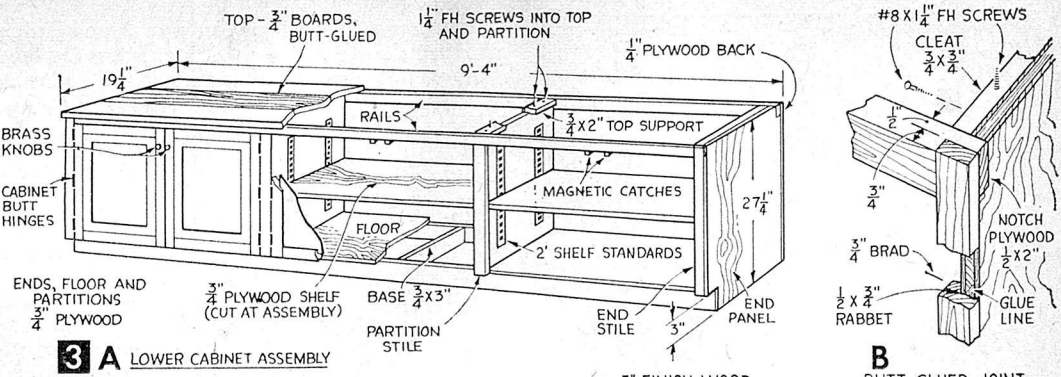
You will probably need to piece the base shelf, if your cabinet is wider than 8 ft. Cut the ¾-in. plywood so the joint will be under a partition as in Fig. 2. Attach shelf to base with 6*d* box nails; where nailheads will not be concealed, use finishing nails.

Cut the end panels and partitions as in Fig. 2 and notch top corners for the rails. Also notch end panel bottoms for the toe space. Cut and shape the stiles and front rail out of finish wood. Note that end stiles are 2 in. longer than partition stiles and rabbeted as in Fig. 3B, while other stiles are grooved. Cut the back rail from pine, but do not notch.

Now glue front edges of end panels and partitions, then fit stiles over the plywood. To hold them in position until the glue sets, tack ¾-in. brads through sides of stiles.

Mark base shelf and top rails to position the partitions at equal distances. Fasten end panels to the outside crosspieces of the base and into edge of the base shelf, using 6*d* and 8*d* box nails. If an end is not to be concealed by a wall, use finishing nails. Prop the partitions in place, glue the top notches and set rails in place in the notches. Nail from back of the front rail into end stiles, using 1 in. brads. Toenail from top of rail into partitions as in Fig. 2. Attach stiles to base shelf by toenailing from the bottom or sides.

If you plan to butt cabinet against a wall, particularly one with a decorative finish, no back is necessary. However, if you want it, cut it from ¼-in. plywood and install as in



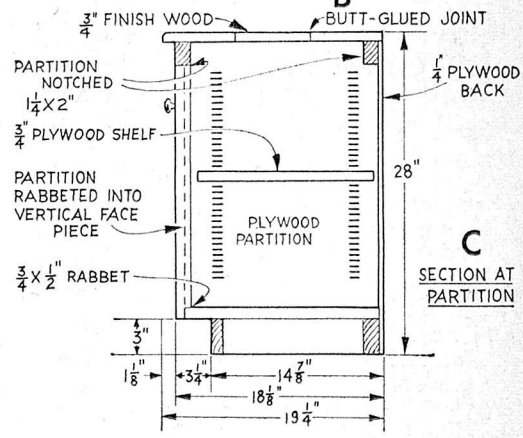


Fig. 3A, using 4*d* box nails spaced 6 in. apart. If back will be seen, spread glue on the plywood and partition edges and tack back in place until glue sets.

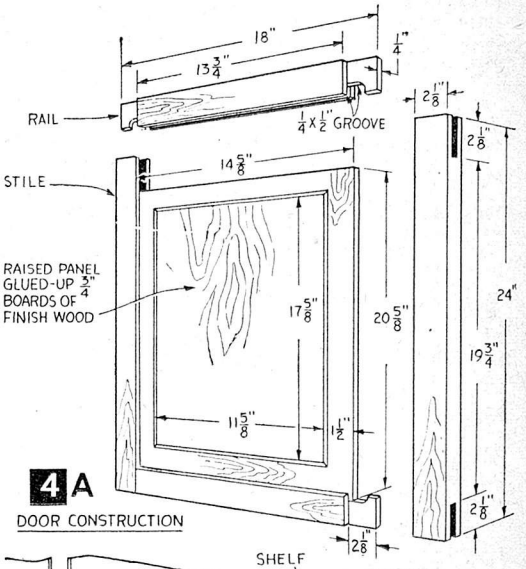
Where the cabinet ends will show, the front piece of the base and top rail ends should be covered. Make the end stiles ¼-in. wider and add this width to their rabbets. Then cut in ¼-in. finished plywood panel the same size as the end panel but eliminate the top notch and reduce toe space notch from 3¼ in. to 2½-in. deep. This can be glued and tacked to the existing end panel. Now cut the top supports and end cleats of pine. Fasten cleats to inside top of the end panels and the supports to top of partitions with #8 x 1¼-in. *fh* screws.

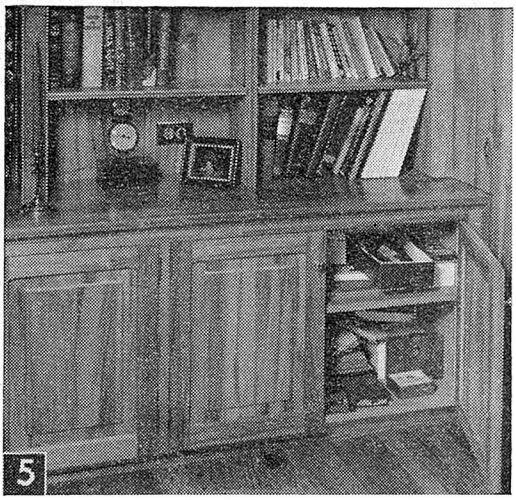
Make the top out of full-length boards of the finish wood. Lay them out on your worktable to the width of the top, glue all inside edges and butt-join them. Hold boards in place with pressure clamps every 2 ft. Slightly bevel top front edge of the cabinet top with a hand plane. After glue has dried, remove clamps. Position top on cabinet frame and fasten from underneath with 3 #8 x 1¼-in. *fh* wood screws to each top support as in Fig. 3A.

Attach the 2-ft. shelf standards to ends and partitions as in Fig. 3A and C. Cut the plywood shelves ½ in. less than depth and width of cabinet openings to permit adjustments on the shelf clips furnished with the standards.

Custom Cabinet Doors shown in Figs. 1 and 5 were designed to match the room's semi-rustic appearance and traditional furniture. Cut rails and stiles to dimensions in Fig. 4A, modified to fit the height and half the width of a cabinet opening. Cut framing ends for ¼-in. mortise and tenons as in Fig. 4A, using a dado blade. With the same blade cut a ¼-in. groove ½-in. deep on the inside edges of stiles and rails to within an inch of the ends.

To make the raised door panels, glue up three or four boards of the finish wood for each door and clamp until dry. Then trim height and width so each will be ⅛ in. shorter than that of grooved space in the frames. Panels can then float free regardless of con-





Raised panels and turned-edge rails on cabinet doors, and shaped edges on adjustable shelves of bookcase are pleasing custom touches. Not yet needed for books, shelf compartment with electrical outlet displays illuminated color photo, weather gages.

traction or expansion of the wood.

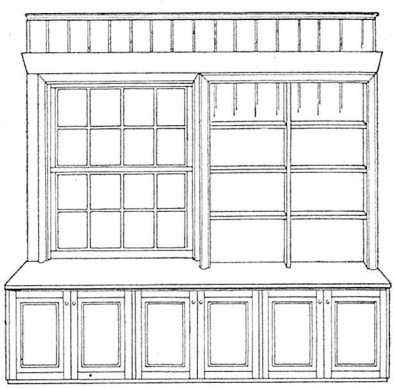
You can raise the front of the door panels as in Fig. 4B with a molding head cutter attached to your bench saw. To raise panel backs, lip them with the bench saw blade. Variations in the design can be obtained according to the types of shaper heads you use.

To assemble doors, slip stiles over a center panel. Glue the tenons and clamp rails in position on panel and stiles. Mortise door stiles and cabinet stiles for butt hinges and install doors on cabinet using #8 x 1-in. *fh* screws. Attach knobs as in Fig. 4B and install door catches as in Figs. 3A and 5.

Build the Bookcase to rest on the cabinet. The open case in Fig. 6A was designed to stand as high as the window frame and occupy all wall space between window and side wall.

Cut all pieces from ¾ x 9½-in. boards of the finish wood after modifying dimensions in Fig. 7A, except the outside vertical member, which will stand against the adjoining wall. Note that end panels are doubled with spacer blocks separating the pieces just enough to be faced with molding revealing ¼ in. of panel on each side, as in Fig. 6C.

Make outside boards of the end panels 2½ in. longer than inside boards and cut in dadoes in them as in Fig. 7A to let in the top board. Cut similar dadoes in the top board to let in the inside boards of the end panels and the partition. The vertical against the wall can be pine since it won't be seen. Or you may wish to eliminate this by substituting the 3-strip optional installation in Fig. 7B.

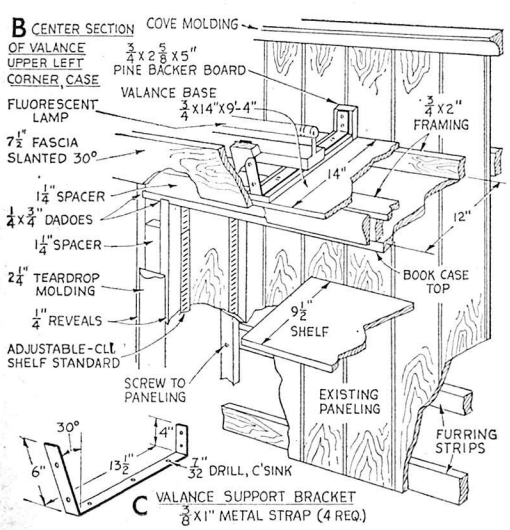


6A STORAGE WALL (FRONT)

Before installing inside boards of the end panels, dado ¼-in. deep grooves in them as in Fig. 7C to recess the shelf standards. Cut similar grooves on both sides of the partition. Grooves should extend about 46 in. from the top of panels and partitions, so that they will hold 48-in. shelf standards cut to 44-in. lengths and leave enough room to finish off the groove smoothly with filler blocks as in Fig. 7C. Cut blocks from scrap of your finish wood, bevel bottom edges to clear rounded kerfs and glue them into the groove ends.

Slide top board in the end panel dadoes, then position entire case over the cabinet top. Secure it by toenailing along panel edges into cabinet top and wall paneling. Toenail through end panel edges which will later be covered by molding into the wall paneling and cabinet top, using 6*d* and 8*d* finishing nails. Also toenail through front edge of partition.

When top board is in place, install a similar length of ¾ x 2-in. framing directly over the front edge, spaced by 1½-in. blocks as in Fig. 6B. This will provide a nailer for the top molding. Fasten another length of this framing on end to back of cover and against the wall. Install molding around case, using



6*d* nails. Also nail a 1-in. face strip on front edge of partition.

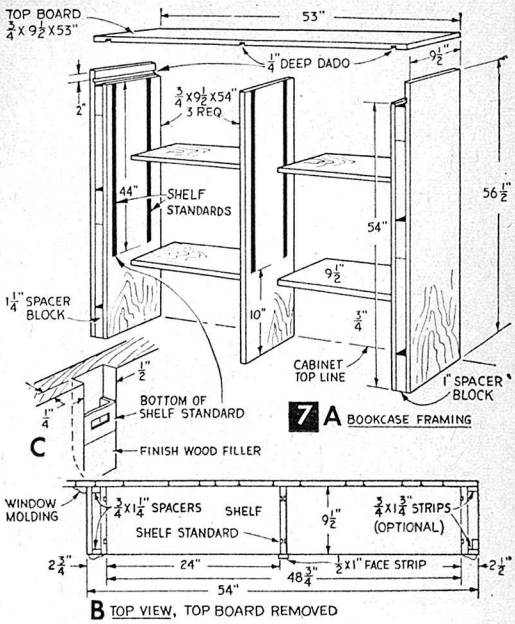
The Lighting Valance (Fig. 1) rests over the bookcase and window frame, and is also supported by four iron straps. Your local blacksmith or metalworking shop can shape the straps for you as in Fig. 6C.

Since part of the valance base over the window will be exposed, it will be best to make it by joining two wide boards of your finish wood. Position base over cabinet and window framing, and attach with 6*d* or 8*d* box nails. For more support on the open end, you can install a wall cleat made of the same molding used for the bookcase and window.

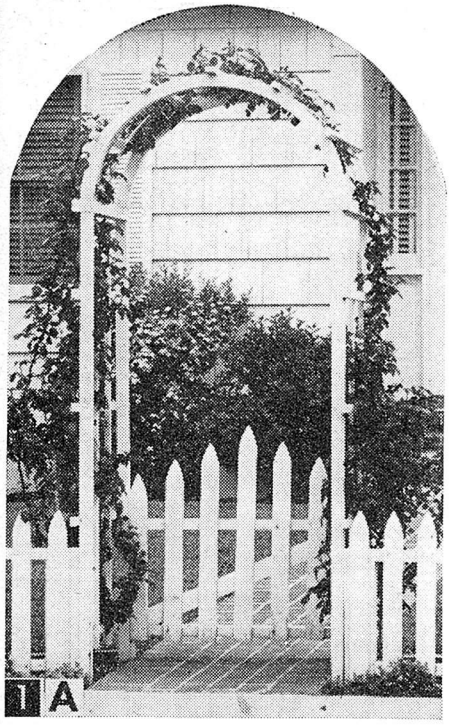
Attach back and bottom of straps with #12 *fh* screws to backer boards securely fastened to wall paneling and valance base as in Fig. 6B. Complete the job by attaching slanted fronts of brackets to backer board and fascia board with #12 x 1¾-in. *fh* screws. The valance is now ready for wiring and installation of fixtures for two 4-ft. fluorescent light tubes.

Before finishing, go over the entire storage wall to set all exposed nails and brads. Fill holes with wood filler tinted to match color of the wood and sand smooth. Now you can apply a wiping stain, if desired, then follow with two or three coats of a quick-drying clear lacquer. Sand lightly and dust well between coats. Use fine (00) steel wool after final application and rub in a paste wax.

You can install a matching valance on the opposite end of the room, using the metal brackets as sole support and longer screws to secure them directly to the wall studs.



"I think it's overwork, Doctor. Now he's talking about ordering some naughty pine."



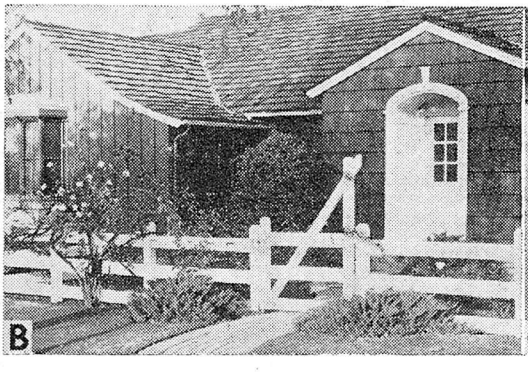
Fresh Faces for Old Home Fronts

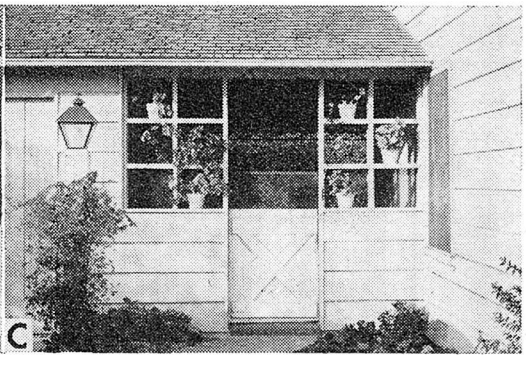
BY FRANK HEGEMEYER

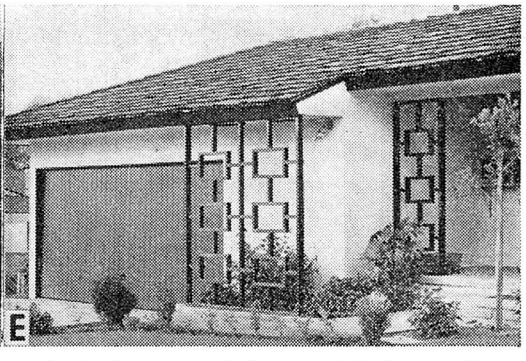
REAL ESTATE agents indicate that designing a new "face" for an old home may increase its value up to 15%. It will certainly be easier to sell.

The low-cost design improvements shown here provide considerable latitude—they may be used singly or combined with each other, as long as the selections harmonize with the architectural style of the house. Dimensions given may also be altered to suit. To simplify construction, specified thicknesses and widths are confined mostly to standard mill runs which need be cut to length only.

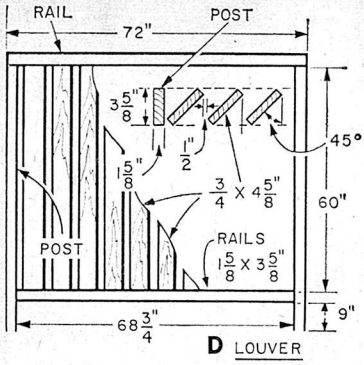
Fences and Gates. To make sure any fence or gate design you select will harmonize, it's a good idea to sketch or paint it on a photo of your house beforehand.

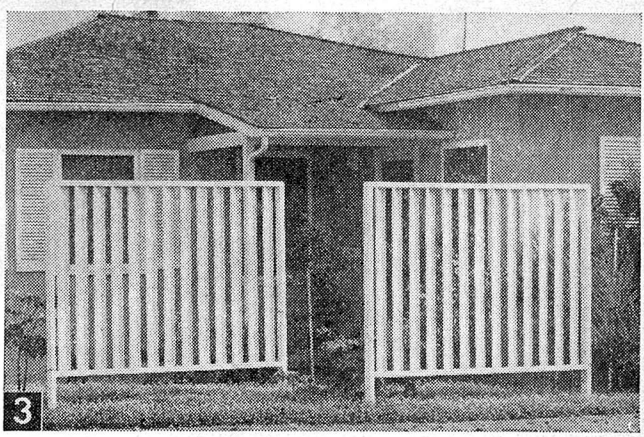




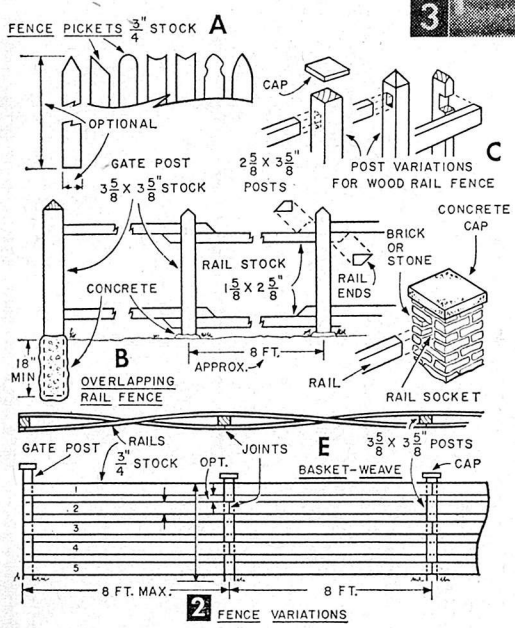


Five ways to "lift" old homes: A—archway with recessed gate, B—corral gate for a ranch look, C—outdoor room in breezeway, D—rails and trim between posts, E—Oriental divider planter.





Louvered fence panels provide front entry with effective shield from nearby walk.



Picket fences (as in Figs. 1A and 2A) are old favorites, particularly for colonial-style homes. Rail fences (Figs. 1B, 2B and C), which are easier to build and care for, run a close second. The louver fence, increasingly popular, can be built in sections (Fig. 2D) to screen off entrance doors from the street as in Fig. 3, or unattractive parts of the yard.

The basket-weave, a relative newcomer, is also finding favor rapidly. You can make it with posts spaced up to 8 ft. apart and adjacent rails criss-crossing to opposite sides of posts as in Fig. 2E. Posts should be imbedded in concrete—at least 18 in. below grade if for a fence 3 ft. high, and 2 in. more for each additional foot of height.

Fencing should be kept well painted. A good grade of pine will do for all parts except the posts, which ought to be redwood or cypress. Before installing, treat below-ground sections of posts with two or three soaking coats of creosote.

No fence is complete without a suitable gate. One of the most substantial is the solid colonial type in Fig. 4 made up from three ¾ x 11½-in. boards (known as 1 x 12s in dimensional size). To assemble as in Fig. 5 glue-join the boards with a waterproof adhesive. Cut the facing boards for each side out of ¾ x 4⅝-in. stock (1 x 5s), except wider pieces at the bottom which could be ¾ x 9½ in. (1 x 10 nominal). If possible, use a shaper to make the stop-chamfers. Apply framing on one side of the gate with 4*d* coated common nails, then turn up other side and frame with 6*d* nails.

Prepare a cardboard template from the graph squares as in Fig. 5A to scribe cutting line for the pediment and cut with bandsaw or coping saw. Shape the fillet, cap and turned finial as in Fig. 5, and install. Many lumber yards will furnish the finial if you do not have a lathe to turn it out yourself.

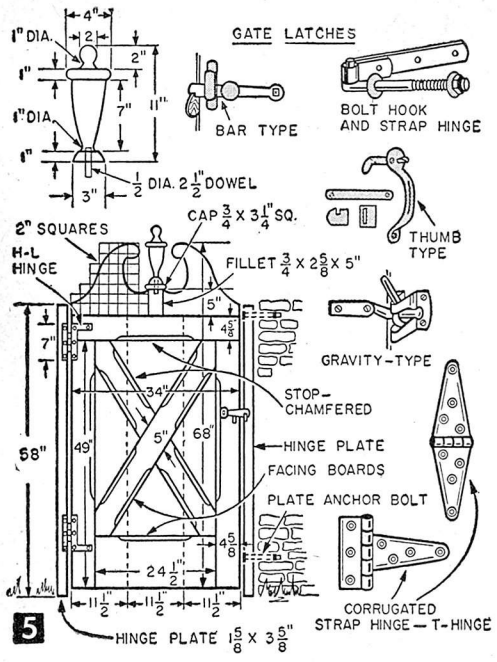
The archway-gate as in Fig. 1A goes hand in hand with a picket fence. Assemble posts, stretchers and lattice strips as in Fig. 6A. Cross-brace the front and back posts until unit is cemented into the ground.

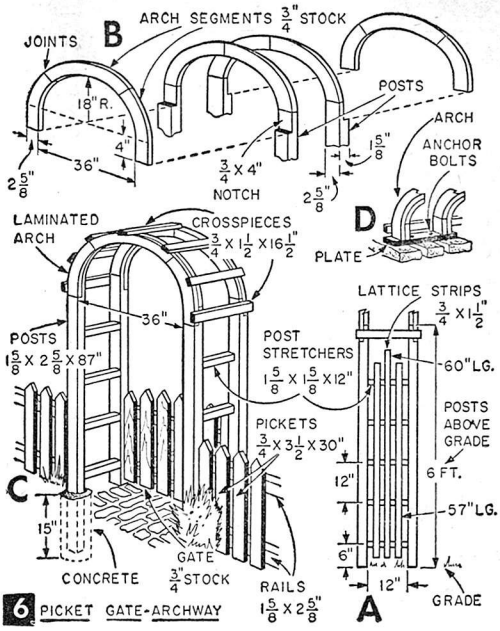
Prepare two laminated sections for the arch as in Fig. 6B, using ¾-in. stock. Join segments with waterproof adhesive and 4*d* nails, then position the sections in the post notches the same way. Add crosspieces, set posts in concrete as in Fig. 6C and remove bracing.

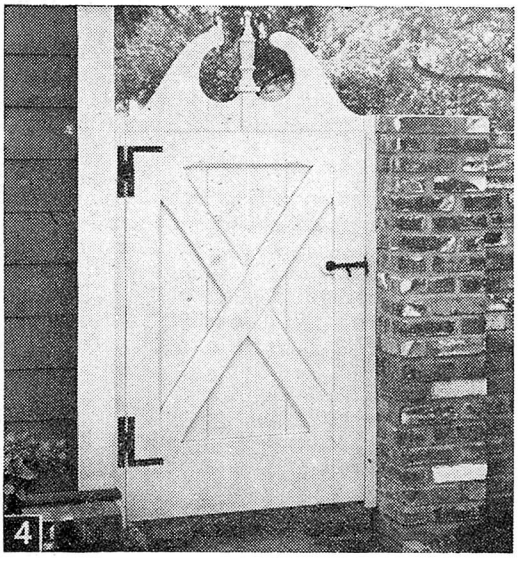
You can adapt this archway to brick posts by anchoring it to bolts imbedded in the mortar as in Fig. 6D.

A wagon-wheel gate, appropriate for ranch homes, is detailed in Fig. 8A. Wheels are usually available at antique, second-hand or junk dealers and discarded croquet balls will serve well as post balls.

The anchor gate in Fig. 8B is a natural for seashore residences and beach cottages. The corral-type gate in Fig. 1B is built in the same manner.







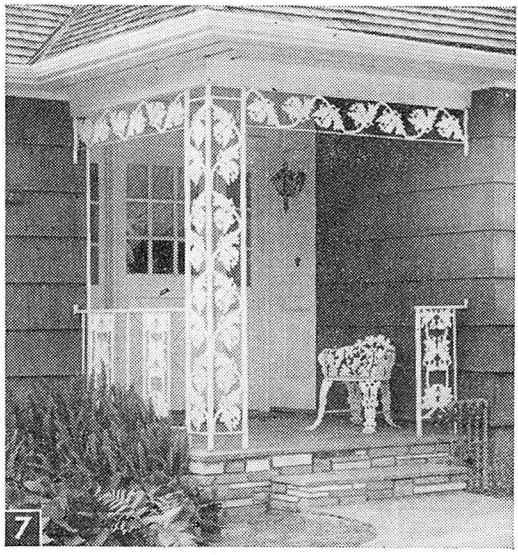
Solid, high gate adds much to the privacy of a yard or garden area.

Various styles of latches and hinges are shown in Fig. 5C. Be sure to select hinges sturdy enough to support the gate.

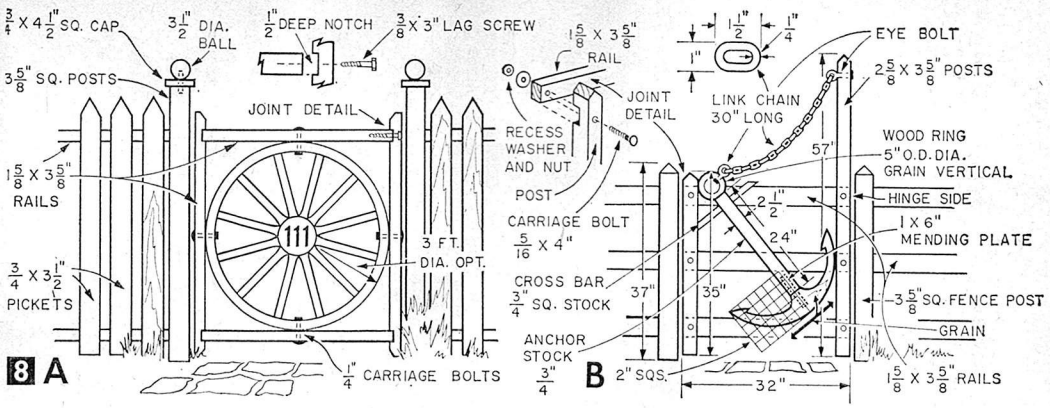
Porch Improvements. Figure 7 shows how ornamental iron work can replace a wood post and trim. When making a similar conversion, be sure the porch overhang is amply supported before removing the old post. You can obtain such ornamental posts and trim from dealers listed in phone books under *"Iron Work"* and from some hardware dealers. They are usually custom-made to your specifications.

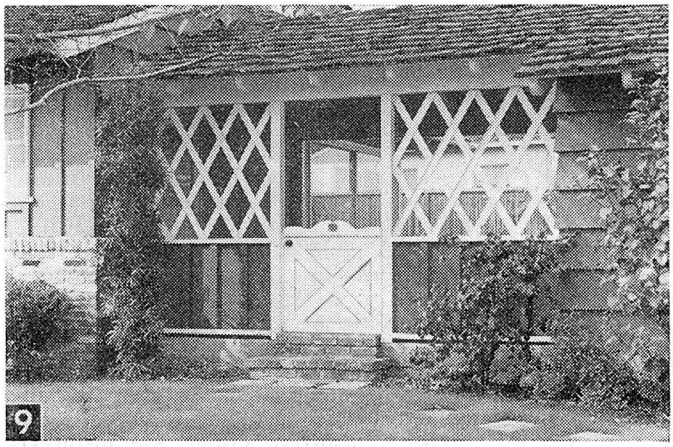
For a simple, inexpensive porch railing you can use 1⅝ x 2⅝-in. stock (2 x 3s) as in Fig. 1D. Or, using the same wood, you can install open-effect vertical dividers, such as the Oriental pattern in Fig. 1E.

Breezeway Walls. Enclosing the covered

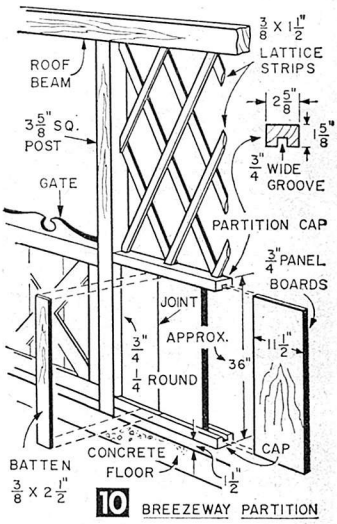


Ornamental iron work is easy to install on porches but, unless you are building new work to fit standard you may need to have parts made to order.





Simple breezeway improvement uses stained redwood board and batten siding to match that of house. Light lattice-work above is positioned so screens can be installed inside. It can be removed quickly for future installation of windows.

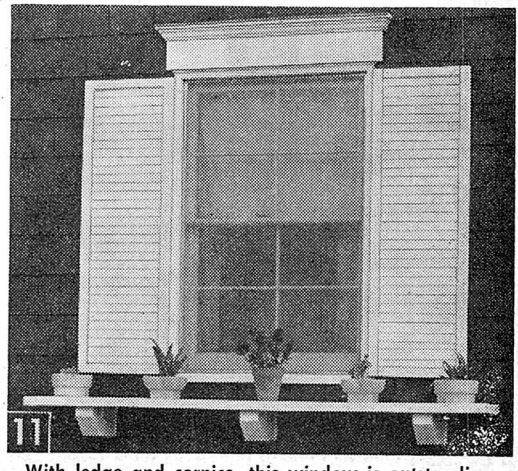


area between your home and garage adds, in effect, an outdoor room with whatever amount of privacy you wish. If you make it harmonize with the siding, your house will appear larger.

An easy way to improve your breezeway is to build a low-wall partition with center gate and lattice work above as in Figs. 9 and 10. Two posts installed for the gate are the only heavy pieces needed. You can nail up wall plates to garage and house siding and run grooved cap rails between posts and plates for vertical board siding.

First toenail the lower grooved cap to wall plates and posts with 10*d* nails. Then install boards in the grooves, fit top cap to the boards and toenail in place to posts and plates. Nail battens on both sides to conceal board joints and cover joints where boards meet posts and plates with quarter-round molding. Toenail ends of light lattice strips in place and reinforce them where they cross with #18 x ¾-in. wire nails.

The breezeway in Fig. 1C matches the clapboard siding of the house and uses 1⅝ x 3⅝-in. vertical and horizontal members (nominal 2 x 3s) to form shelf frames for small potted plants. In both instances, the gates are similar in construction to that detailed in Fig. 5.



With ledge and cornice, this window is outstanding.

Installing Outdoor Lights Correctly

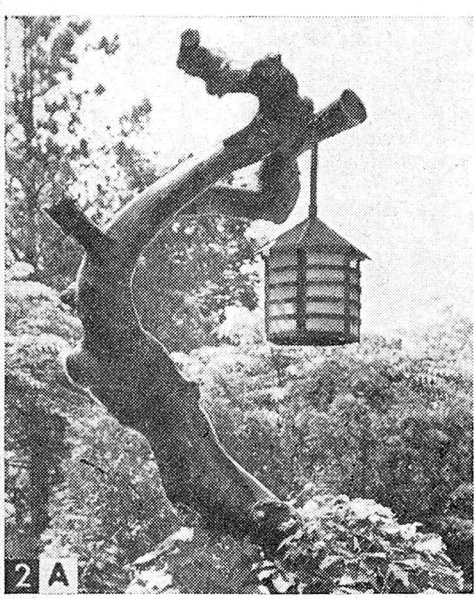
POPULARITY of outdoor living today has so stepped up the demand for outside lighting that new homes often have highly decorative front and rear yard lights (Figs. 1 and 2) as well as exterior door lights and a convenience outlet for every terrace, patio or porch.

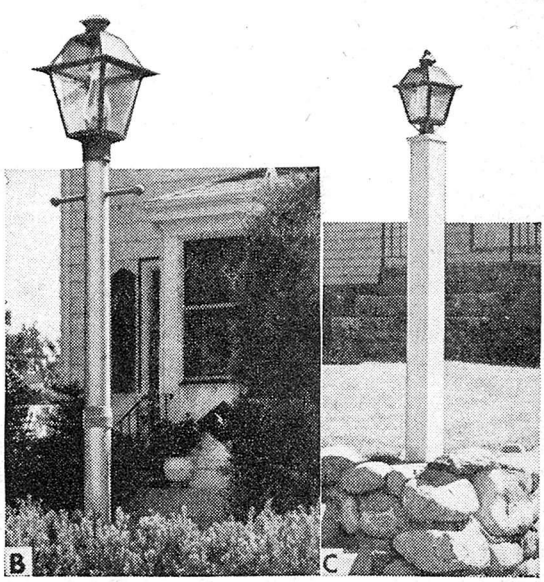
If your home is of pre-war vintage, its outside illumination may be limited to a single porch light. Once you have your home power supply stepped up to a realistic 100-amp service, however, you can easily add outside lighting where you want it. Anyone who has ever cut in a wall switch or outlet on an interior wall could do the job with the appropriate weatherproof equipment and wiring.

Before starting, be sure to check local city, township or village building department regulations. Most permit an owner to make wiring changes in his own home subject to inspection and approval of the work, but local codes often differ over types of wiring.

Outlets. Portable lighting and cooking appliances are so commonly used that convenience outlets outside the home are practically mandatory. Flush-type outlets are installed in the house siding within a standard switch box but use a rubber gasket as in Fig. 3A. A weather-tight screw cap (Fig. 3B) protects the outlet when not in use.

Surface-mounted types with condulets for





Unit in impressive setting above was entirely homemade, including sheet copper lantern. Fig. 2C, simple box post made by nailing together four pieces of ¾-in. wood. Fig. 2B, typical commercial metal post available with or without lantern in wide price range.

rigid conduit are used in masonry walls.

If you're planning a yard light, you can install an outdoor outlet at the same time. Connect the switch for the light from a junction box as in Fig. 5A. To install an outlet only, run a 12-gage two-wire armored (BX) cable from a convenient junction box having a 12-gage wire feed.

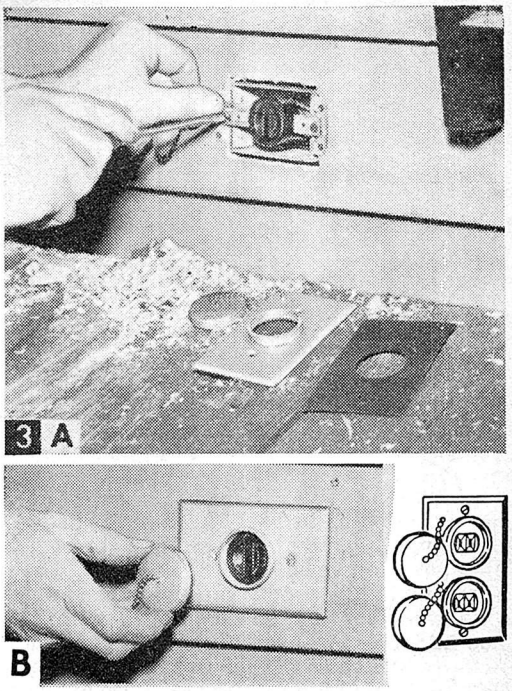
Such cable should be fused at 20 amps—minimum size for an outdoor outlet into which any appliance up to 20-amp capacity can be plugged. If you use a 12-gage extension cord on the line between appliance and outlet, this will allow a working distance from the fuse panel of approximately 150 ft. and a load of approximately 1725 watts with a maximum allowable 2 percent voltage drop (see Table A for specific information on cord types).

Double weatherproof outlets (Fig. 3C) are just as easy to install as single units in the same size switch box. Along patios and other outdoor living areas, it is now recommended that convenience outlets be installed for every 12 to 15 ft. of usable outside wall.

Yard Lights. A solid, round post well turned and tapered to fit an imposing colonial lantern as in Fig. 1 is becoming increasingly hard to find. Among the best sources are wrecking firms that specialize in dismantling old homes on large estates and offer the lumber for resale. Many such posts were used originally as porch columns.

Before they can be converted to light posts, they pose a special problem—to form a hole for the wiring they must be carefully center-drilled from each end with a special cutting tool or they must be sawn lengthwise in half, grooved and glued together again to form a hole for the cable.

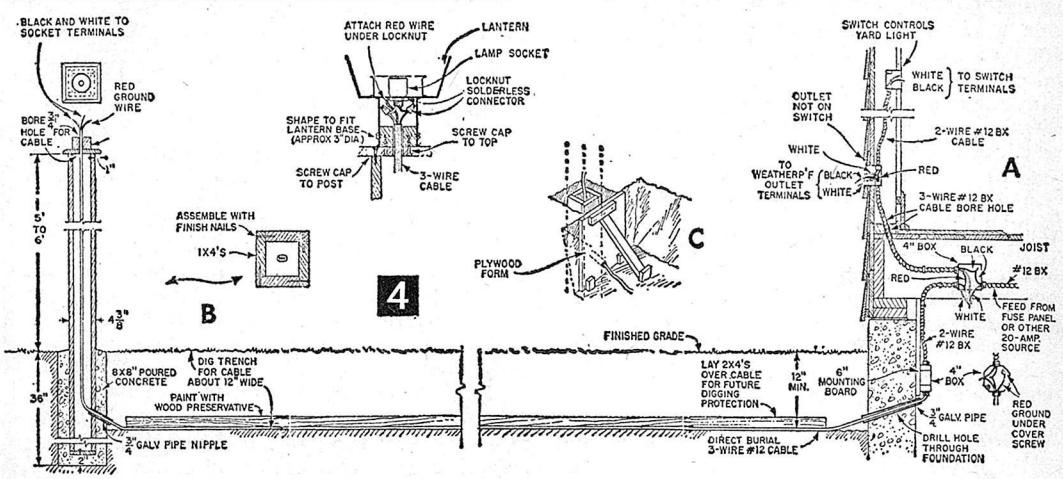
The easiest post to make is the box type (Fig. 2B), using 1 x 4-in. white pine boards as in Fig. 4B. If you desire a rustic type and can't procure one prebored, make it from a

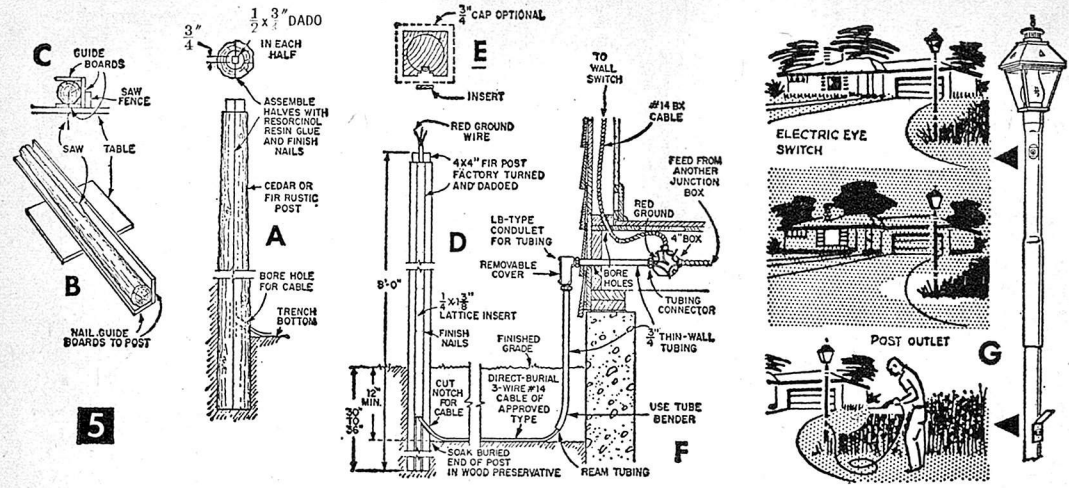


Outdoor outlet is installed in a receptacle box in the same manner as indoor outlet. To keep weather out, rubber gasket fits behind the plate and screw-cap tightens over outlet. Unit shown assembled at right can be installed vertically. Double outlet is also available.

TABLE A—PORTABLE CORDS
Carrying Capacity in Amperes

Wire Size No.	Rubber Types C, E, EO, K, P, PD, PO, Thermoplastic ET	Rubber Types S, SJ, SJO, SO, SP, SR, Thermoplastic SPT, SJT, ST, SVP	Asbestos, Asbestos & Rubber, Neoprene AFSJ, HC, HPD, HPN, HS, HSJ, AFS
18	5	7	10
16	7	10	15
14	15	15	20
12	20	20	30
10	25	25	35





cedar or fir log as in Fig. 5A. Simply-made jigs shown in Fig. 5B and C will help you saw it lengthwise in two halves.

At most building supply yards, you can buy a solid wood lantern post equipped with a lattice insert as in Fig. 5D and E to cover a groove for the cable. After installation, two coats of paint will hide the insert. Also available at many electrical or building supply houses are adjustable metal posts (Fig. 2C).

Some deluxe versions of metal posts are equipped with convenience outlets and one type (Fig. 5F) features a photo-electric control unit to turn the lantern on automatically at sundown and off at sunrise.

Setting the Post. Once your post is ready, locate its position and dig a hole about 8 in. dia. and 3 ft. deep. Cut a narrow trench at least 12 in. deep from this hole to the house foundation at point closest to the junction box where you intend to connect the cable (Figs. 4 and 5). Install a ¾-in. galvanized pipe nipple with a tight fit through one side of the post at a point about 10 in. below intended grade level (Fig. 4B). Push a small-gage wire or length of clothesline about 10 feet long through the pipe and post and tack the end temporarily at the post top.

If you set the post in concrete, the only form necessary is for that portion open to the trench as in Fig. 4C. Pour a 2-in. bed of concrete in the hole, position the post and true it with a carpenter's level, then fill in the remainder of the hole. About two bags of prepared concrete mix, such as *Sacrete* will be sufficient for the job. If you don't want to bother with concrete, be sure to apply a creosote wood preservative liberally to the below-grade portion of the post before installing it. When dry, fill around the post with well-tamped gravel and dirt.

After the post has been set, seal the knots with shellac and apply a coat of exterior primer paint. When dry, putty all seams and nail holes, smooth any rough areas with fine sandpaper and apply one or two coats of exterior house paint.

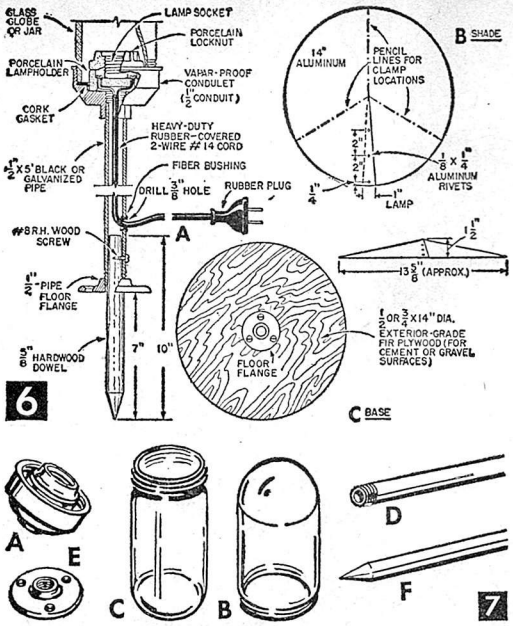
Cable Connections. While the paint is drying, you can prepare for the wiring connection by boring through the foundation for a length of galvanized pipe as in Fig. 4C or through the house sidewall just above the foundation for tubing as in Fig. 5F.

Now, carefully measure the path your wiring will take from wall switch to post lantern and order a couple of extra feet when buying the cable. Use a direct-burial type of three-wire cable approved in your locality. Specify 12-gage cable if the line includes one or more outlets, or several yard lights.

Attach a cable end to the line in your post, then pull it through the pipe to the top where you can anchor it with an insulated staple. Attach the ground wire (red or green) under the locknut of the fixture and fasten the black and white wires to the fixture leads with solderless connectors as in Fig. 4B. Attach lantern base to the post with wood screws. Extend cable along the trench bottom and push the other end through the pipe leading into the house. Cut off any excess and attach cable black lead to wall switch and ground wire to a connector on switch box. Now shut off power while hooking up other side of switch and cable white lead to nearest junction box, using 12-gage, two-wire BX cable.

Caution. Play it safe and cover the cable in the trench with lengths of 2 x 4 treated wood before filling in the ground slit. Such a protective shield is even more important to new home owners who already have yard lights installed but, upon careful checking, discover their burial cable may lie only a few inches below the surface and without a cover.

Months later when digging for a new lawn or garden, you may be rather forcibly reminded about the cable if you fail to protect it from danger of shorting or cutting.



(A) Conduit; (B) globe; (C) quart jar which can serve as globe; (D) black pipe; (E) floor flange; (F) hardwood dowel.

Portable Yard Light. You can make a streamlined portable light as in Fig. 8 for about half the cost of commercial products of comparable quality. Many of the less expensive commercial types are very attractive and effective but use a solid metal rod of small diameter for a post. This tends to sway in a breeze and requires the line cord to be installed externally. This outside connection in the base of the lamp housing high off the ground sets up a dangling cord arrangement that is untidy and potentially dangerous.

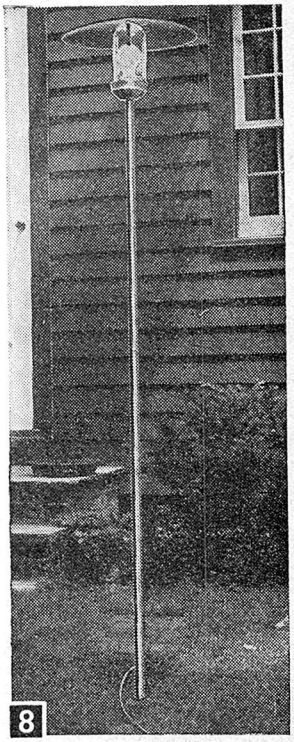
To make a portable yard light, purchase from your electrical supply dealer a vapor-proof condulet for ½-in. conduit (Fig. 7A) and a glass globe (Fig. 7B) which screws into the condulet. Some types of quart jars have screw tops (Fig. 7C) that will also fit condulet threads.

The condulet contains a porcelain lamp holder and a cork gasket, as well as a threaded nut for ½-in. pipe. From your plumbing supply dealer, buy a 5-ft. length of ½-in. black or galvanized pipe threaded at each end (Fig. 7D) and a ½-in. pipe floor flange (Fig. 7E).

MATERIALS LIST—PORTABLE YARD LIGHT

1 vapor-proof condulet for ½" conduit
1 condulet globe or glass jar
1 length ½" x 5' black or galvanized pipe
1 ½" pipe floor flange
1 length ⅝" x 10" hardwood dowel, or
1 fir plywood base, 14" dia.
1 fiber bushing (BX-cable type)
1 length (to suit) heavy-duty, rubber-covered, 2-wire, #14 cord
1 heavy-duty rubber plug
1 aluminum lamp shade, 14" dia.
3 spring clamps
6 aluminum rivets, ⅛" x ¼"

Pointed hardwood dowel anchors yard light in turf.



Drill a ⅜-in. hole into the pipe about 5 in. from one end, as in Fig. 6A. Round both inner and outer edges with a small file to prevent damage to the line cord when pushing it through the pipe. After assembly, insert a BX-cable type fiber bushing in hole (Fig. 6A).

If you plan your light for turf or ground as in Fig. 8, taper one end of a ⅝-in. hardwood dowel slightly for a tight fit into the pipe and point the other end as in Fig. 7F. Drill a hole in the pipe for a #8 *rh* wood screw; attach floor flange, insert dowel and lock it with the screw (Fig. 6A).

For cement, flagstone or gravel surfaces, make a base from exterior-grade fir plywood and attach a floor flange as in Fig. 6C.

To install the electric cord, remove porcelain locknut, then porcelain lamp holder (held in place by two screws), and screw condulet to pipe. Push cord through hole, attach black and white conductors to socket terminals, reassemble lamp holder and put the fiber bushing in place.

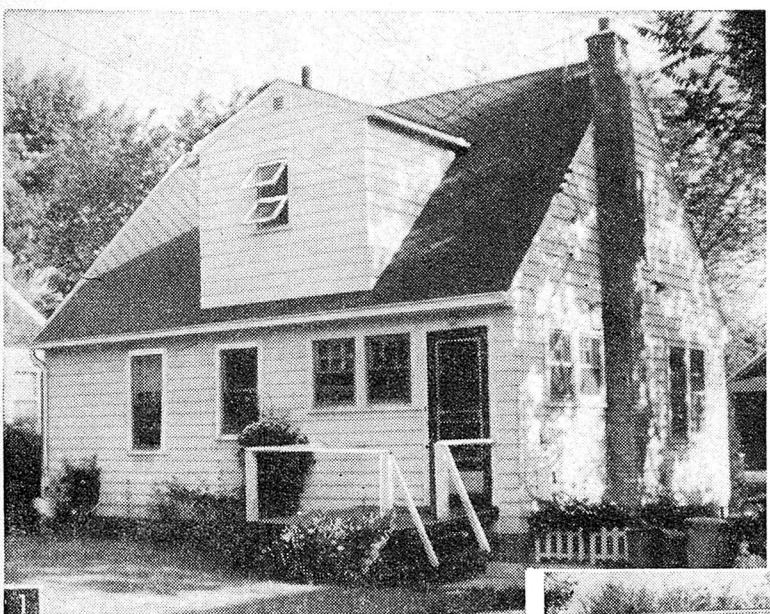
You can make a conical lampshade easily from *Reynolds Do-It-Yourself* sheet aluminum, assembled with aluminum rivets as in Fig. 6B, and shade clamps made from a pair of tool-holder spring clips of the type stocked by local hardware and variety stores. To make the clamps, cut the spring clips apart with a hacksaw, bend ends to angle of shade and drill a hole in each clamp for a ⅛ x ¼-in. rivet. Position the glass globe by eye measurement, locate clamps on previously penciled lines, and rivet. Repeat with other clamps.

To apply paint to aluminum and the pipe, wash with vinegar, let stand 30 minutes, then remove vinegar with water. Dry thoroughly, then apply one or two coats of flat black metal paint. Underside of shade can be left bare or painted with a coat or two of flat white for improved reflecting qualities.

How to Install a Dormer in a Day

There's no danger of exposing the interior of your house to damage from rain when this method of dormer construction is followed

By FRED BLAKEMORE and ALAN YOUNG

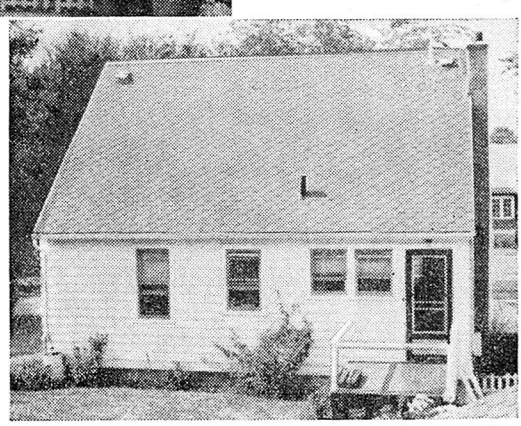


Inset photo at right shows rear view of house before dormer was built. Large photo shows completed dormer which encloses bathroom on second floor of house.

IF YOUR home has sufficient roof-peak height in the attic to allow for a dormer, you can, with the help of a friend, install a dormer similar to that shown in Fig. 1 and make it weathertight enough in one day to protect your home! From cutting the opening in your present roof to completing dormer should not take more than two days. The trick is in constructing and partially preassembling the various components of the dormer on the ground so that after the opening in the roof has been cut the preassemblies will fit into place without wasting time for on-the-job cutting and fitting.

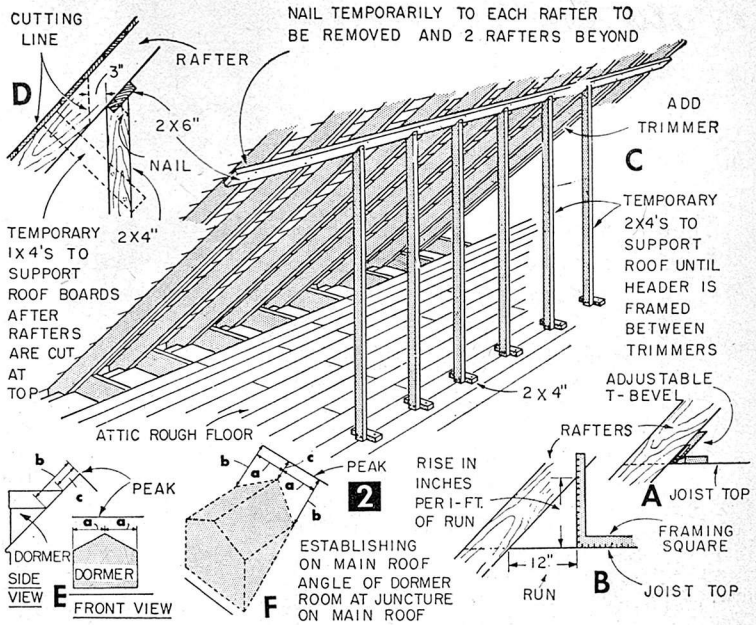
Of the three types of dormer roofs, the gable, hip and shed, the gable is the most practical for the preassembly method because of its truss-type construction (Fig. 3-D). Your first decision is the location of your proposed dormer. If your home already has dormers and you need a third, locate it on the opposite roof side between the existing ones to lessen the strain on the roof. If the dormer is for the purpose of an extra bathroom, as in our case, location of existing plumbing (vent stack) automatically determines its location. It was for this reason that we had to locate the dormer window slightly off center. If possible, however, center the window or windows.

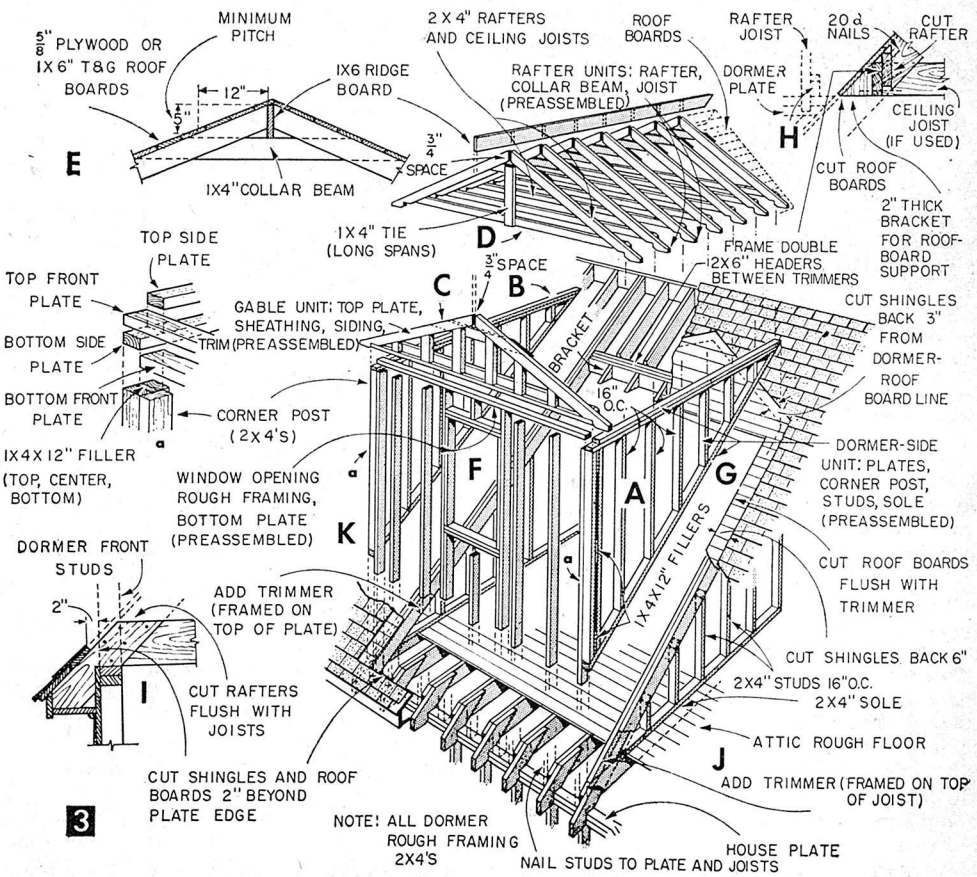
After deciding on location, your next step is to make accurate scale drawings of the dormer construction based on existing rough framing, that is, accurately measured locations of existing rafters, joists, and

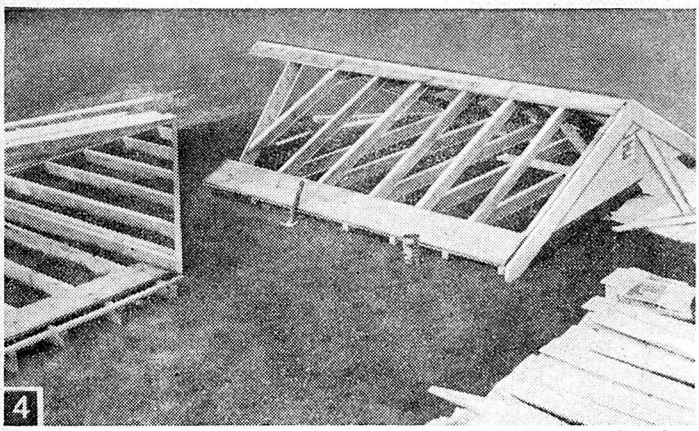


the like. This is important since your dormer construction will rest on and be attached to these existing structural members (Fig. 3). The larger the scale the more accurately you'll be able to dimension your drawings. A ⅛ in.-equals-1 in. scale is ideal for accuracy which, in architect's

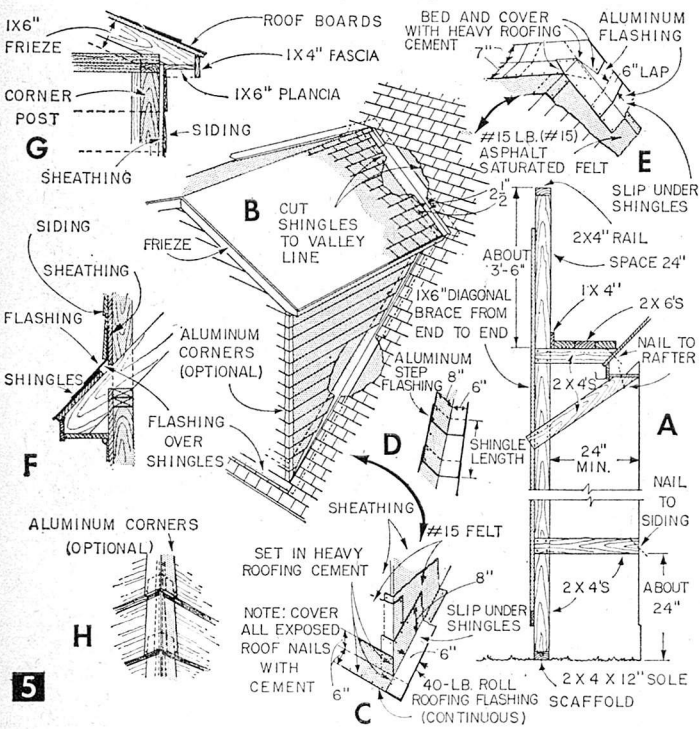
language, is 1½ in. equals 1 ft. A triangular-shaped scale having the above and many other ratios is obtainable at any art-supply store. To obtain the pitch or angle of your present roof, use an adjustable T-bevel as in Fig. 2-A. All angles of dormer side framing and the like can then be scribed with the T-bevel setting for accurate cutting and fitting. For drawing purposes, you can use a carpenter's framing square as in Fig. 2-B to determine the rise in inches per foot of run, which can then be transferred to your drawings as such, or the degree of angle then taken with a protractor. Getting the







Temporary assembly of roof members and dormer front. Sheathing boards were temporarily tacked on for accurate fitting, cutting and coding. Preassembled side rough framing is at left.



correct angle of your existing roof is vital for dormer construction, so double-check the findings of the framing-square method against the T-bevel method—the degree of angle must be identical. To have your preassemblies fit into place within the opening area in your roof, you'll need at least a detailed front view of all dormer structural members and existing structural house members. (Studs rest on house plate, nailed to it, and against joists or rafters wherever possible.) You'll also need a detailed side view of roof and side-wall structural members as indicated in the perspective views and sections shown in Figs. 3, 5-F and G. Dimension your drawings plentifully (length of every piece noted) so that you need refer only to them rather than to the house itself when cutting and fitting your preassemblies on the ground. The degree of pitch to your dormer roof is to a great extent governed by the existing roof height; the least amount of pitch allowable for a shingled roof being a 5-in. rise per 1-ft. run—or 22½° (Fig. 3-E).

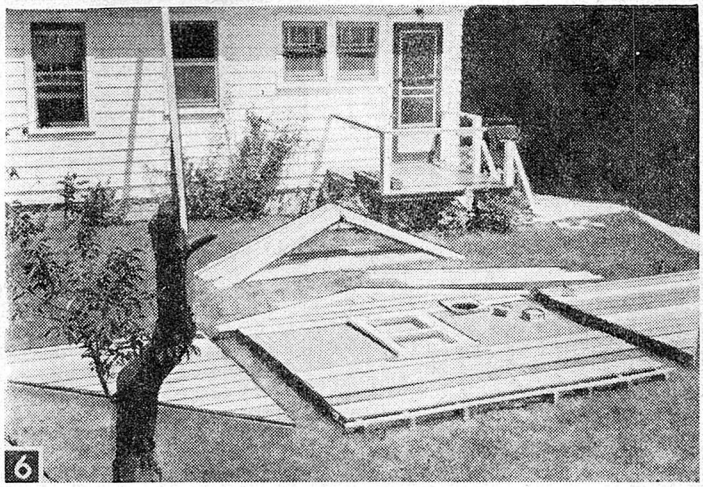
Your working drawings having been completed, checked and double-checked, you can order your lumber. Lumber requirements must be calculated from your scale drawings in the actual sizes in which it is furnished (see Table A). For all lumber dressed on two or more sides these actual sizes are slightly less than the nominal sizes used when ordering. Lumber costs are based on the board foot (sq. ft.), which is a nominal 1 x 12 x 12 in.

Your lumber delivered, you can begin cutting, fitting and partially assembling the various dormer components (Fig. 3). If your dormer front, like ours, is going to be nearly 10 ft. wide, preassemble permanently only that portion for the rough window framing and bottom plate (Fig. 3-F), otherwise, the assembly will be too heavy to hoist into place. To keep this assembly square, nail a temporary 1 x 6-in. brace diagonally across on the inside. Balance of front studs are cut to size on the ground and framed after preassembly is in place. The dormer sides rough framing (Fig. 3-A), being relatively lighter in weight, can be permanently assembled. Note the corner-post

TABLE A—LUMBER DATA

Actual size inches	Nominal size inches	Board feet foot of length
25/32 x 1 5/8	1 x 2	1/6
25/32 x 3 5/8	1 x 4	1/3
25/32 x 5 5/8	1 x 6	1/2
25/32 x 9 1/2	1 x 10	5/6
25/32 x 11 1/2	1 x 12	1
1 5/8 x 3 5/8	2 x 4	2/3
1 5/8 x 5 5/8	2 x 6	1
1 5/8 x 9 1/2	2 x 10	1 2/3
1 5/8 x 11 1/2	2 x 12	2
2 5/8 x 5 5/8	3 x 6	1 1/2
3 5/8 x 3 5/8	4 x 4	1 1/3
3 5/8 x 5 5/8	4 x 6	2

construction (Fig. 3-Aa) with its interlocking top and bottom plates which enables you to frame the front easily and quickly. The 3-member post allows for nailing surfaces for interior wall material. Studs whenever possible should be 16 in. apart between centers for easy application of interior wall materials which come in panels 4 ft. wide, designed for this spacing. The gable-end framing (Fig. 3-C) can be completely preassembled, being relatively a small unit: rough framing, sheathing, 15-lb. (#15) asphalt-impregnated felt, siding and frieze (Figs. 5-G and 8). If you plan to use a gable ventilator, that, too, can more easily be fitted in place on the ground. These aluminum ventilators come in various sizes, square and triangular in shape. All that is required to attach them is to frame 2 x 4-in. backing of the correct opening size. They are nailed over the sheathing with the siding material lapping the edges slightly for a weather-tight joint. Normally, dormers do not have ventilators if adequate ventilators have been installed in the main-roof-gable ends. In our case, we needed the extra ventilation.



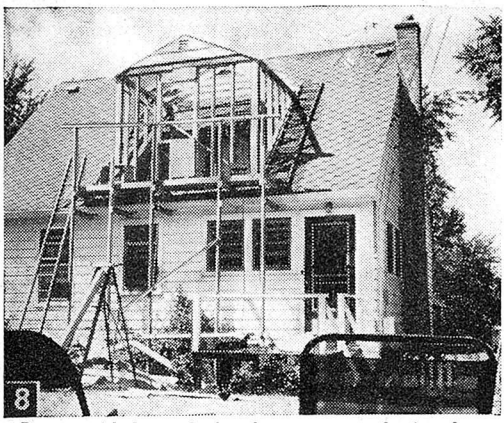
Sheathing and siding material is fitted, cut and coded on front and side framing for quick assembly when frames are permanently in place.

Scaffolding and ladders firmly anchored, roof opening is cut and rafters removed, ready for dormer assembly.

A word about sheathing materials. You have a choice of three types: 1) Tongue-and-groove (T&G) boards (nominal 1 in., usually 6-in. width); 2) Asphalt-saturated fiber panels (½ and $^{25}/_{32}$ in. thick); 3) Fir plywood, sheathing grade (Plyscord), $^{5}/_{16}$ to ¾ in. thick (½ in. usually used for walls, ⅝ in. for roofs). T&G boards, as sheathing material, are being supplanted by insulation and plywood panels although the former make the tightest joints. They must be laid with tongue towards roof peak. Insulation panels afford better insulation but require special self-clinching nails for siding materials except over studs. Plywood is most commonly used because of speed in applying it, its rigidity and because it will take standard nails at any point. Since it comes in panels from 4 x 8 ft. to 4 x 10 ft., large surfaces can be sheathed quickly. We happened to have used fiber panel sheathing for wall surfaces and T&G boards for the roof.

The dormer-roof-structural members can be permanently preassembled: rafters, collar beams and ceiling joists (Fig. 3-D). Allow a ¾-in. space between rafter ends at peak for on-the-job insertion and nailing of a 1 x 6-in. ridge board. You can now temporarily assemble the roof members, correctly spaced, insert ridge board and temporarily tack on sheathing material for correct fitting and cutting (Fig. 4). If T&G sheathing boards are used, mark on each the rafter center and drill small lead holes for nails; also code each board with a letter and number so that final assembly can be speeded up. Example: Starting at the bottom, letter "R" for right, "L" for left side and consecutive numbers—1, 2, 3, etc. Identify in some way panel sheathing pieces, if used instead of boards. Sheathing material should be beveled to roof angle where it joins main roof. Also mark and code location of each rafter unit on side plates.

Next, fit sheathing over dormer frames, tacking here and there for accuracy; then, fit and cut siding material as in Fig. 6, but do not nail permanently. Also code these materials for quick iden-



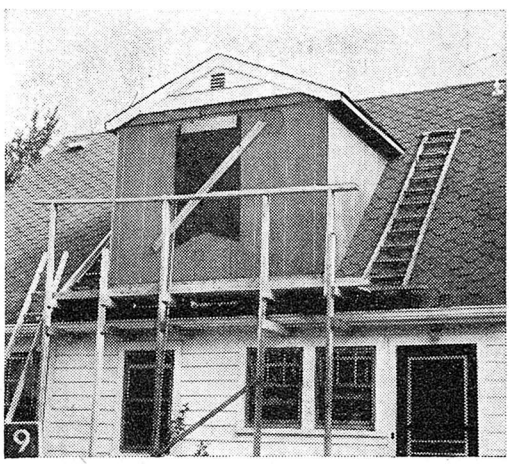
Preassembled rough framing permanently in place and nailed. Note dormer-gable end which was permanently assembled on the ground.

tification on the job, and drill small lead holes for nails into studs and the like. The dormer siding material should be the same as the rest of your house, its application determined by the type. In our case, we used beveled, ship-lap siding which made assembly easy and fast. If your house has regular beveled siding, the ship-lap type will approximate its appearance and it's available in various widths.

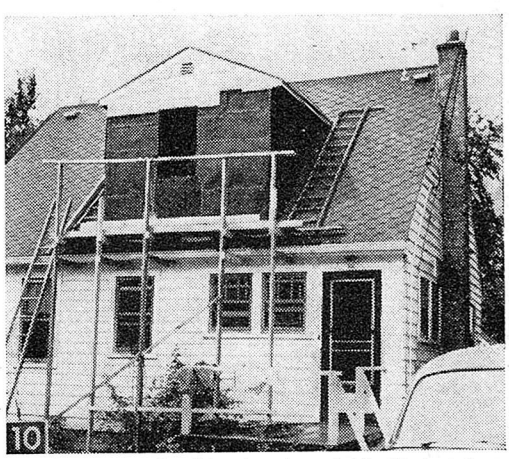
Preassembled windows are sold by all lumber yards, complete with drip cap, sill and trim, needing only to be inserted and nailed into the rough-frame-opening. Before designing and building your rough-frame-opening (which should be slightly larger than window), get from your lumber dealer the rough-opening size required for the particular window you have in mind. When installing, use shingles as wedges between window casing and rough frame to align window, then nail to studs with wedges in place; saw off surplus wedges flush. Before installing window, give it a coat of exterior primer, inside and out. For much-needed ventilation, we used the double-awning type of window.

A carefully constructed scaffold (Figs. 5-A and 7) not only is a must for maximum safety, but also expedites cutting the roof opening and final installation. Double-headed scaffolding nails can be used for easier dismantling. Sturdy ladders alongside the proposed roof opening are also a must. They must be securely anchored to avoid accidents.

Before any roof cutting can be done, the roof must be reinforced; first, temporarily, to allow cutting the opening (Fig. 2-C and D), and then permanently by framing and nailing two headers of roof-rafter size to cut rafter ends and trimmer rafters on each side of the opening (Fig. 3-H). Before temporary bracing is installed, however, frame an extra rafter to each rafter on each side of the proposed opening; that is, accurately fit rafter against existing ridge board and, in one instance, to top of floor joist (Fig. 3-J), in the other to house plate (Fig. 3-K). These doubled rafters now become trimmers. Nail them securely together with 10d nails from both sides, spaced 16 in., staggering location of nails. Also nail securely with 10d nails to ridge board, top of joist and plate. These added rafters must fit snugly against ridge board, joist and plate. Now, temporarily brace roof as shown in Fig. 2-C. To establish cutting lines of roof opening, drive a few nails through roof from inside along side of trimmers, at top and bottom; then, from outside draw chalk lines on roof and remove nails. To establish dormer roof angle where it joins main roof, proceed as in Fig. 2-E, carefully snapping or drawing chalk lines on roof. From this line you can then establish chalk lines for cutting shingles (Fig. 3). If your shingles are of the asphalt type, a linoleum-cutting knife or a special detachable-bladed knife for this purpose (building-supplies firm) will make the job much easier. With all lines estab-



After applying the sheathing to the walls on the day we cut the roof opening, we decided to finish the dormer the next day. The dormer is at this point temporarily weather-tight.



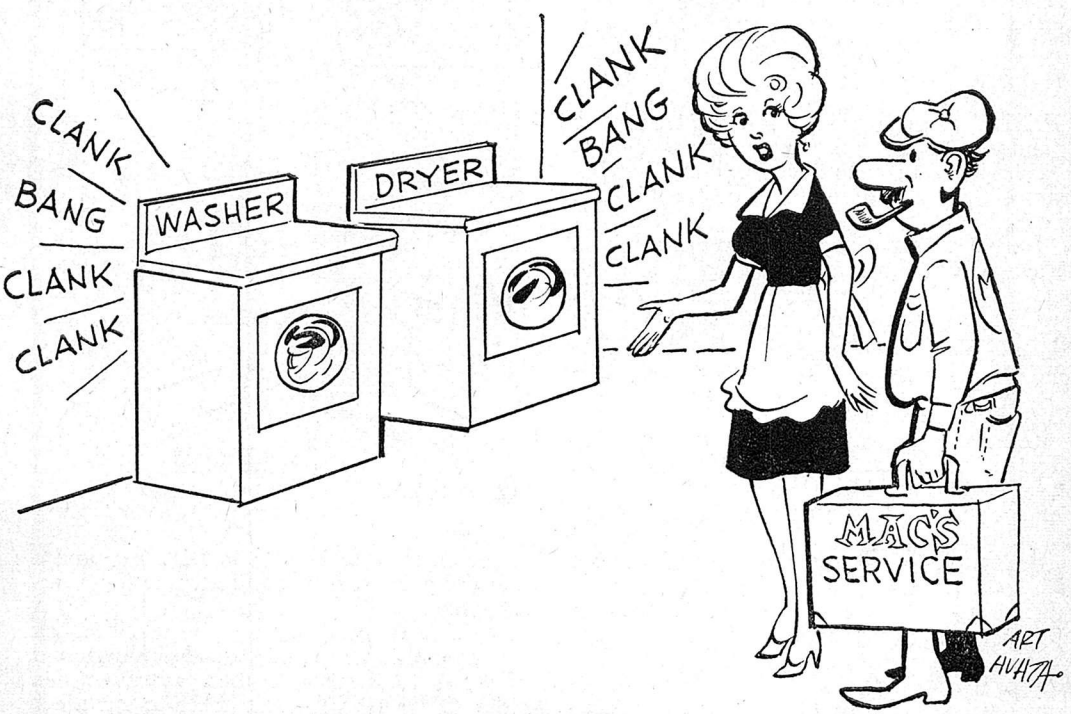
#15 felt over sheathing has been laid. Start at the bottom when laying so that horizontal laps (about 6 in.) are weather-tight. Dormer is now ready for insertion of factory-assembled window and siding material.

lished, cut out shingles and saw roof sheathing and remove, leaving exposed rafters. Then, cut rafters at top from inside and temporarily brace remaining roof sheathing as in Fig. 2-D. Now, saw off rafters at eave flush with joist tops (Fig. 3-I) and remove rafters. Nail rafter extensions securely to joists. Snugly fit headers between trimmers and nail first header to each cut rafter end and securely to trimmers; then, other header to first and to trimmers (Fig. 3-H). Nail brackets to headers and remaining roof sheathing. You are now ready to assemble and nail into place your dormer components, starting with the two sides. Level and plumb components with a carpenter's level and temporarily brace front assembly with a 1 x 6-in. diagonal brace from the inside, allowing to remain in place until dormer is completely finished (Fig. 8).

With all rough-framing components securely nailed into place, attach prefitted and precut sheathing material (Fig. 9); then, #15 felt with staples or roof nails (Figs. 5-C, E and 10). You must then install flashing at juncture of dormer roof and main roof, called valley flashing (Fig. 5-B and E), and along the sides where they join main roof (Fig. 5-B and C). Copper or aluminum valley flashing is best. If copper is used all joints should be soldered. Flashing must be slipped under existing main roof shingles, requiring lifting nailed shingles which, when flashing is in place, must be renailed. Cover all exposed roof nails with heavy roofing cement, forcing cement well around and over nails with a putty knife. Flashing along sides of dormer can be top-grade roll roofing (not less than 40-lb. type), or aluminum step flashing (Fig. 5-D). With step flashing, each section should be slipped under corresponding shingle line. Here, too, shingles may have to be lifted and renailed as with the valley flashing. Where dormer front joins roof extension, flashing must be attached over existing shingles, cemented and nailed in place (Fig. 5-B and F).

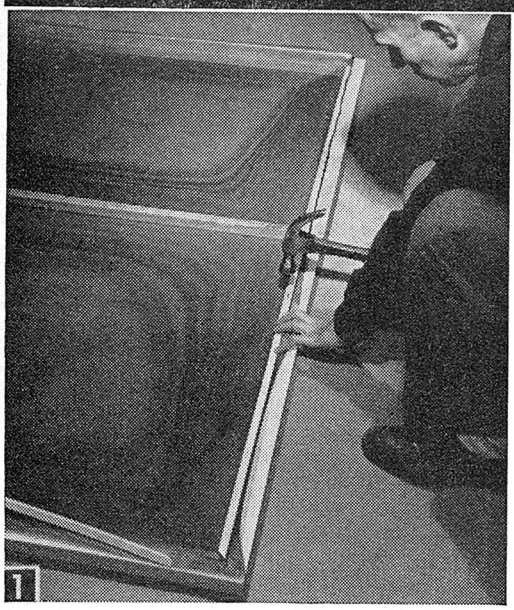
With flashing in place, you can now apply shingles to dormer roof (instructions for installation come with the shingles). This done, you can nail into place your precut siding material. To avoid the chore of mitering beveled siding at corners, difficult to fit properly on preassemblies, you can use aluminum siding or shingle corners (Fig. 5-H). These enable you to cut your siding to fit the corners flush, the preformed corners making a weather-tight joint. Finally, attach plancia and fascia boards to dormer eaves (Fig. 5-G) and you re ready to prime coat the completed dormer. A primer especially for aluminum is best for the corners, if used. When primer coat is thoroughly dry, one or two exterior finish coats complete your dormer.

It took us two days from the starting of the cutting of the roof opening to the installing and finishing of the dormer. We used roll roofing since the top of our dormer roof is not visible from the ground. If yours will be visible, shingles matching main roof should be used.

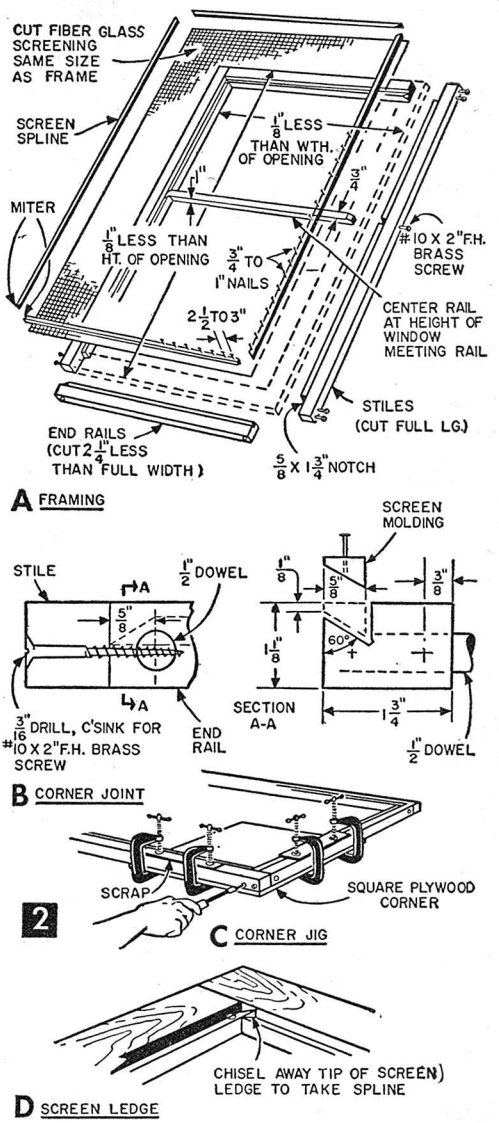


"Like I said on the phone, the racket is in stereo."

New Way to Make Screens Built to Take It



Strips rabbeted from screen stock before assembly hold screening firmly over frame when they are nailed back in place to serve as molding. Nailing action forces wire to follow angled shape of the strips, pulling it tight.



IF NEW screens are needed next summer and you have access to a power saw, here is a simple, yet efficient, way to build durable frames that will give years of trouble-free service.

There isn't a tack in the new design (Fig. 4), yet you'll have to break the wire cloth before it will pull out from any rail or stile. Ordinary screen stock is used throughout for all framing and strips, and a quickly-rigged corner jig assures strong and accurate joints. We selected a fiber glass screening for its reflection-free, no-stretch properties.

Measure your window openings at outside edge of the screen stops, then deduct ⅛ in. from height and width for actual screen sizes. For each window, order screening within ½ in. of height and width, enough standard screen stock to cut out the top and bottom rails, eight to ten #10 x 2-in. *fh* brass screws (depending whether center rail is used or not), and an 8-in. length of ½-in. doweling. For every three screens which will have a narrow center rail, add width of this rail to your screen stock order. A ½-lb. box of copper or aluminum nails ¾ to 1-in. long and a quart of paint will be sufficient for the average job.

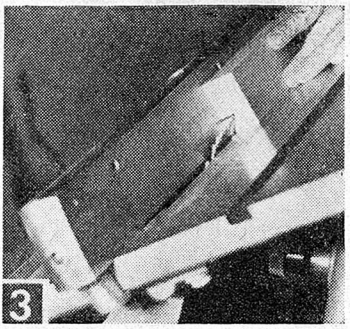
Begin framing by cutting the screen stock as in Fig. 2A, making all stiles full length and rails 1¼ in. narrower than actual screen width. Now set your saw table to cut a 60°

angle rabbet along inside top edge of all the pieces, as in A-A of Fig. 2B and Fig. 3. Be sure to use a narrow blade and save the cutout strips for later use as molding.

Cut notches in the stiles for the end rails as in Fig. 2A, also for any center rail, which should always be aligned with the meeting rail of its window.

For an easy way to make strong corner joints, clamp frame members to a square panel cut from plywood scrap as in Fig. 2C. Doing one corner at a time, drill an end rail for ½-in. doweling and a stile for #10 screws as in Fig. 2B. Install dowel and fasten with 2-in. screws. The dowel will keep the long screws from pulling out of the end grain, making a much stronger joint. Install a center rail after outside frame is finished, one screw at each joint as in Fig. 2A.

Cut out any protruding wood on the rabbeted edges with a chisel as in Fig. 2D, then replace the strips temporarily to mortise the ends as in Fig. 2A. At this point, sand all framing and outside surfaces of the strips. Then paint them to suit your home exterior.

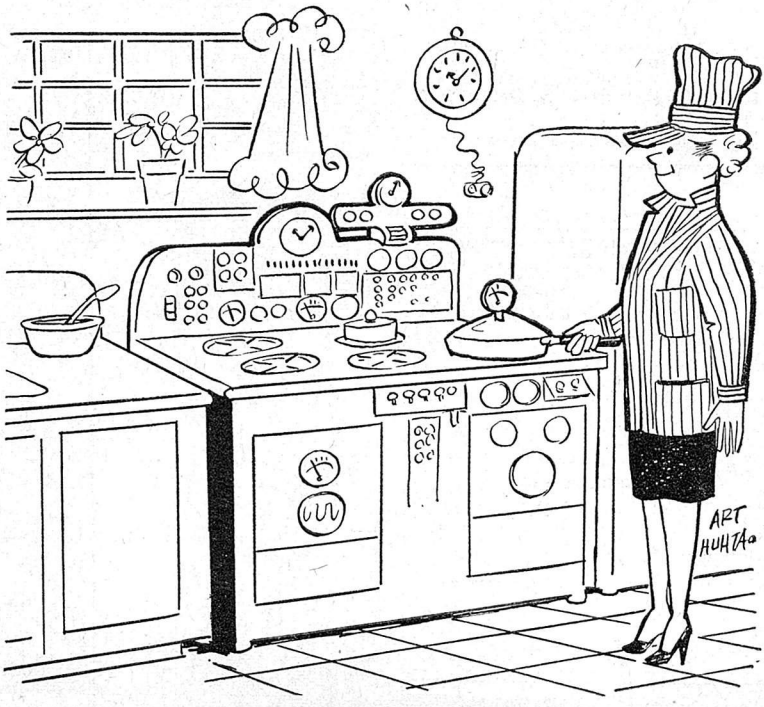


Above, saw table set to cut the acute-angled rabbet in edge of screen stock with a 1/16-in. ply tooth circular blade.

Right, finished screen, ready to install.

Now lay screening over a frame, line up a wire strand with inner edge of a stile, and replace the strip previously rabbeted from this edge. Beginning at the center and working toward ends, nail strip through wire into frame as in Figs. 1 and 2A. Repeat the process with an adjoining strip. Nail up remaining strips after pulling screening taut.

When all moldings are in place, cut away excess screening on outside edge of the molding with a razor blade or utility knife. Dot the nail heads with matching paint, and your screen is ready for the window hardware and installation.—DAVE SWARTWOUT.



Dress Up Your Fireplace

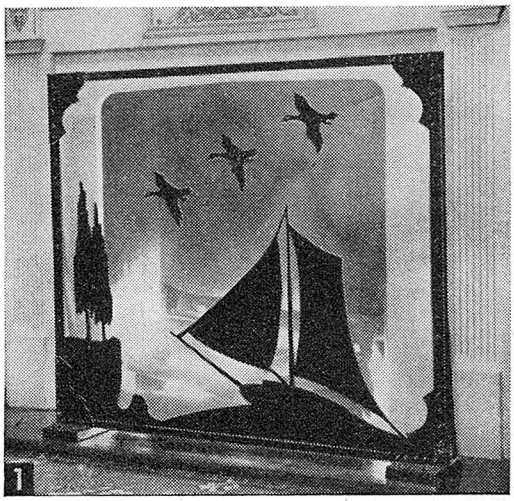
By R. J. DE CRISTOFORO

IF YOU have an artificial or a real wood-burning fireplace, you may need one of these fireplace accessories and, even if you don't, there are good commercial possibilities in these projects. At any rate, they are fun to make.

The all-aluminum screen with cut-out figures appliquéd on the mesh (Fig. 1) can be made of copper or brass, using the same working procedures for either. Start with the frame members (parts #1 and 2), cutting them to exact size (Fig. 2). To make accurate mitered corners cut the angle close to the layout line with a hacksaw and then finish it off to the line on a disc sander (Fig. 3) or by draw filing.

Draw full size layout of corner gusset, including hole locations, on paper and cement to the metal (parts #3 and 4, Fig. 2). Cut out and use as a template to mark off the others. For the two bottom ones, add the half circle shown in bottom left hand corner detail. Bend over flanges on part #4 as shown (Fig. 2). Set the 4 angles on a flat table and clamp the 4 gussets in place, checking each corner for squareness. Drill holes through gussets into angles and hold assembly together with small machine screws.

Next, make the figures (Figs. 1, 4, 5, 5A or 7). The layouts can be made directly on the material but it is a good idea to first draw them full size on paper and then cement (rubber cement is good) or shellac the paper to the metal. This can be removed later with soapy water and steel wool. Use different type shears (Fig. 6) to cut out the figures as close to the line as possible and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MATERIALS LIST—METAL SCREEN

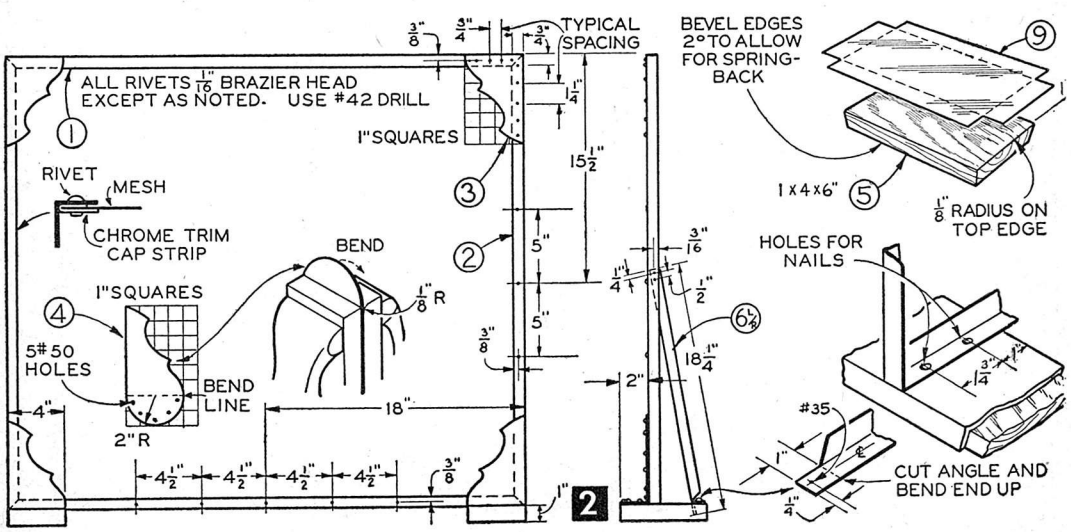
Part No.	No. Req'd	Description
1	2 pcs.	.064 x ¾ x ¾ x 36" ST aluminum extruded angle
2	2 pcs.	.064 x ¾ x ¾ x 31" ST aluminum extruded angle
3 L/R	2 pcs.	.064 x 4 x 6" SO or ½ H aluminum sheet
4 L/R	2 pcs.	.064 x 4 x 8" SO or ½ H aluminum sheet
5	2 pcs.	1 x 4 x 6" hard maple
6 L/R	2 pcs.	.064 x ¾ x ¾ x 18¼" ST aluminum extruded angle
7	1 pc.	.040 x 22 x 36" SO or ½ H aluminum sheet
8	3 pcs.	.040 x 4 x 5½" SO or ½ H aluminum sheet
9	2 pcs.	.040 x 6 x 8" SO or ½ H aluminum sheet
	6 ft.	Chrom-Trim flanged cap strip (from local hardware store)
	3 ft.	36" wide window screen mesh (from local hardware store)
	60	1/16" brazier head aluminum rivets, ½" long
	16	1/32" flathead aluminum rivets, ¼" long
	12	upholstery nails, plain, ½-round head
	4	5-40 screws with nuts, ½" long
	4	#3 flathead screws, ½" long

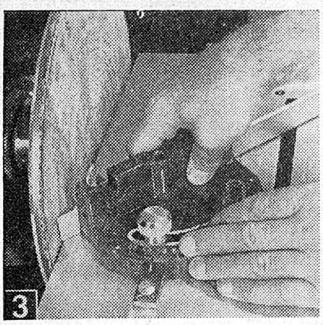
Parts 8 and 9 may be cut from scrap left from part 7.

Purchase aluminum or copper sheet metal from: Metal Goods Corp., 5239-M Brown Ave., St. Louis 15, Mo.

Obtain extruded angle in various metals from: Groundmaster Co., Metal Div., Boulder, Colorado; Richards Industries, Dept. B, P. O. Box 362, Jamaica, N. Y.

Most of above firms also handle rivets of various materials.

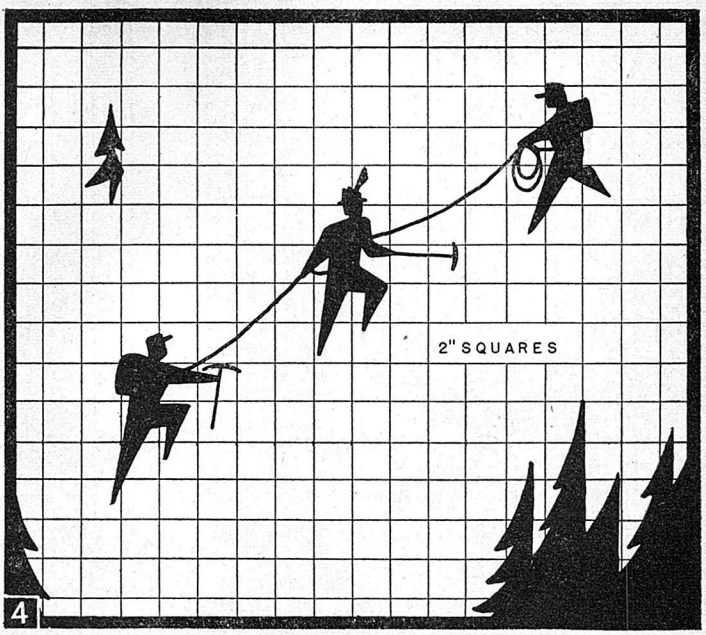


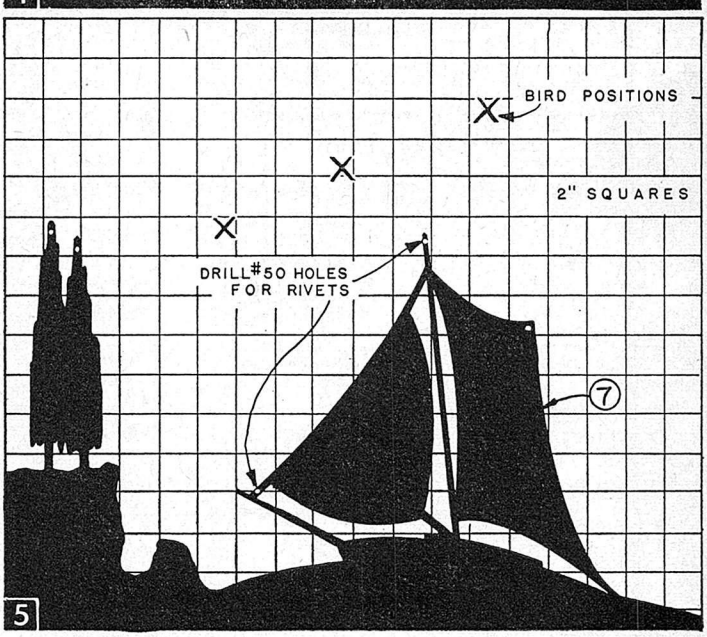


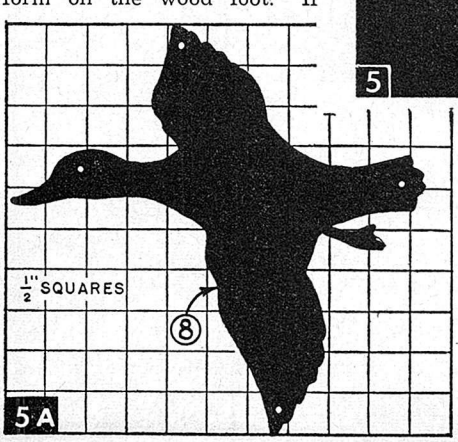
finish off with files and emery paper, or use a coping saw fitted with a metal cutting blade, or a jig saw or band saw. After cutting, go over the edges with a small mill file and finish off with steel wool.

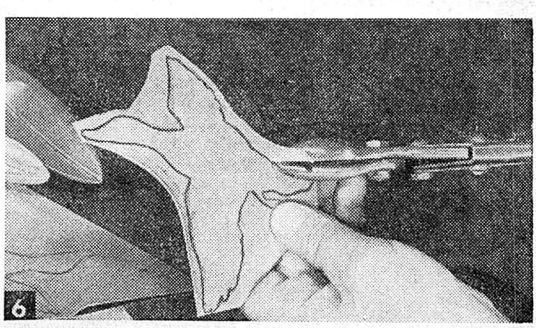
Mount the large figure (#7, Fig. 5) in the frame, drill the holes through it and screw. Cut the mesh about ¼ in. narrower than the actual dimension and frame the cut ends with Chrom-Trim flanged cap strip (Fig. 8) by hammering the narrow flange down to grip the mesh tightly. After this is done place one side in the frame, drill holes and remove the machine screws, then replace to include screen. Stretch screen and secure other side.

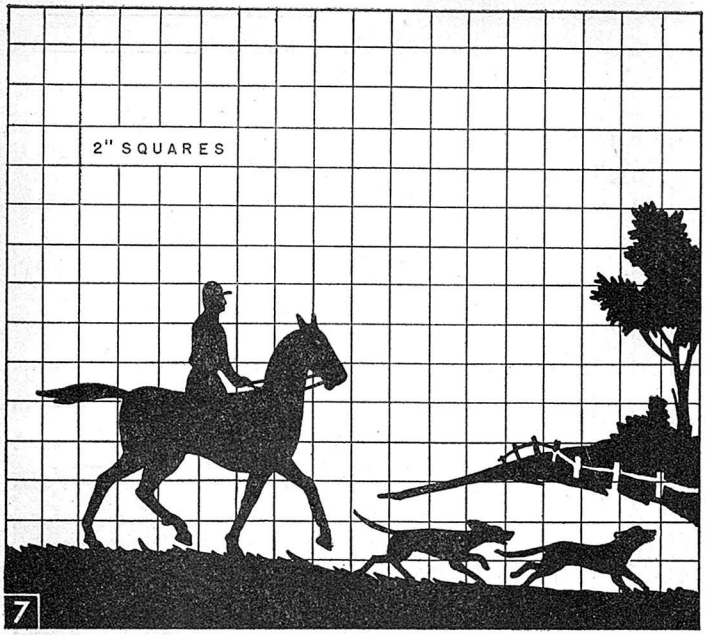
Cut the two wood feet (#5, Fig. 2) to size. Drill holes for the 2 screws or nails which hold the feet and fasten them in place. If you are going to use the screen in front of a real fire, you will need metal feet on the screen (#9, Fig 2). Make the wood part and bevel with a ⅛ in. radius on 4 top edges. Cut sheet metal and form on the wood foot. If

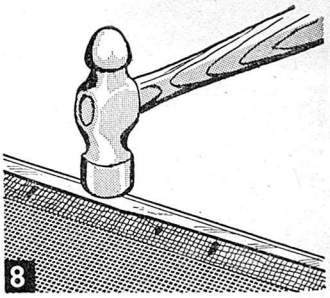


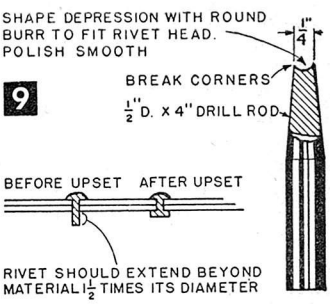












aluminum is used, the corners must be left open; if copper or brass is used, the corners may be soldered. Drill #50 holes through the metal before the nails are used that go into the wood.

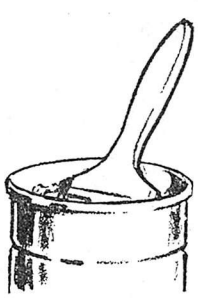
Last, make the two braces (#6 L/R). Shape one end of each as shown (Fig. 2), make the bend, put in place and drill the necessary holes, but do not attach permanently. Break down the entire assembly, and clean out drill chips that have gathered between the parts and burr (remove rough edges) all holes. Then polish all parts. Remove scratches with emery paper in grits determined by the depth of the scratch, using progressively finer grits. Otherwise steel wool will do a good job.

Again assemble the project with machine screws and set yourself up for riveting. This operation requires care and a helper to hold the work while you do the upsetting. For the brazier head rivets you will need a rivet set, which you can make from a piece of drill rod shaped as shown (Fig. 9). Set the rivet set in the vise, remove one screw at a time and replace with a rivet. First snip off each rivet to the length called for, to prevent rivet bending over instead of flattening.

Flathead rivets, which may be upset on any flat metal bar, may be substituted but they are not as attractive as the braziers. Of course riveting may be eliminated through the use of screws with a decorative head—such as rosette-head types (available in hardware stores).

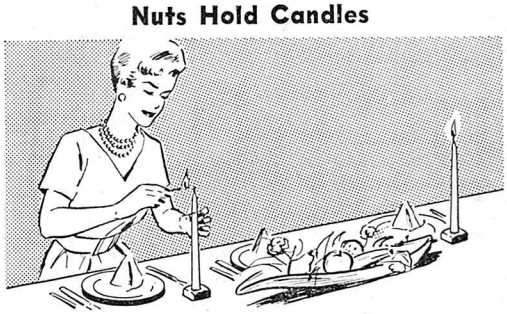
Fasten the 2 braces (Fig. 2) with screws and one nail in the bottom flange, then add the 5 nails in the front of each foot. Tack the figures to the mesh with rivets, paint the wood parts to match the metal, and the screen is ready to do a real job of dressing up your fireplace.

Give Brushes a Soapy Soak



• Soak your paintbrushes overnight in very soapy water, rinse in the morning, and dry.

Nuts Hold Candles



• Large iron nuts make attractive candle holders as is, or painted. Threads hold the candles snugly, and they're heavy enough for tall tapers.

Lampshades, planters, divider screens are just some of the

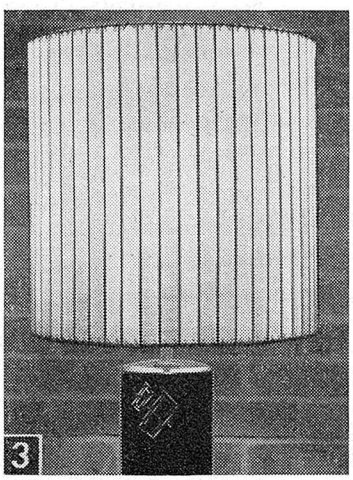
Unusual Uses for Screening

By R. J. DeCRISTOFORO

Kaiser Aluminum photo

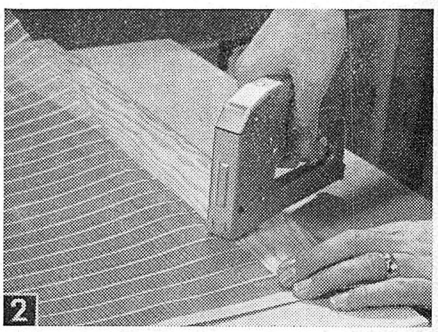
ShadeScreen is made of tiny louvers that block out the sun's rays. Notice how effectively shadow on brick wall proves this.

MADE of thousands of tiny horizontal louvers, *ShadeScreen's* original and most obvious use is as window screening (Fig. 1). The louvers are fixed at an angle that blocks out the sun's rays and are spaced close enough to prevent intrusion by insects, yet they allow plenty of light and ventilation to pass. This attractive material (made by Kaiser Aluminum and Chemical Corp.) can also be used in many unusual ways in the home, as you will see.

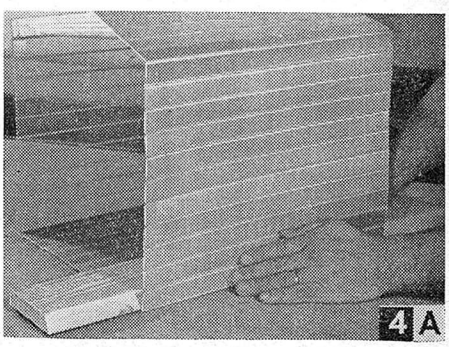


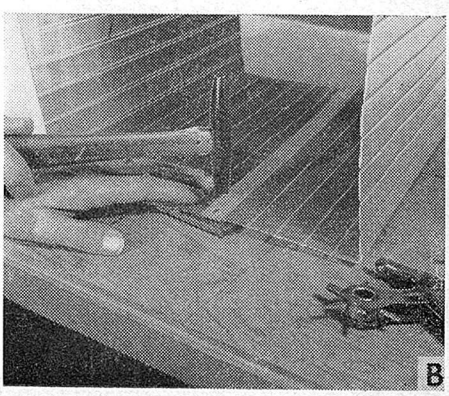
Backed with a translucent material, the screening makes an ideal lampshade. Attaching to wire frame is simple since lacing slips easily through the louvers.

Instructions for working with the screening are few. For a clean fast job of cutting it, use a sharp knife, linoleum knife, ordinary household shears or tin snips. If you decide on a knife, be sure to place the screen flat on a solid surface before cutting.

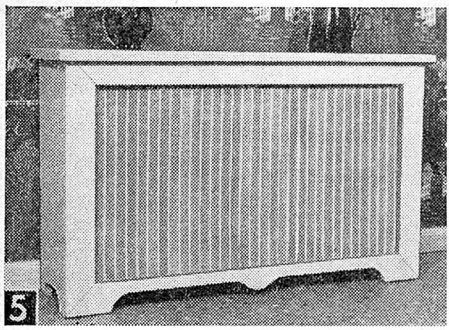


When attaching louver screening to framing, place staples at a 45° angle across each vertical so that they span about three louvers.

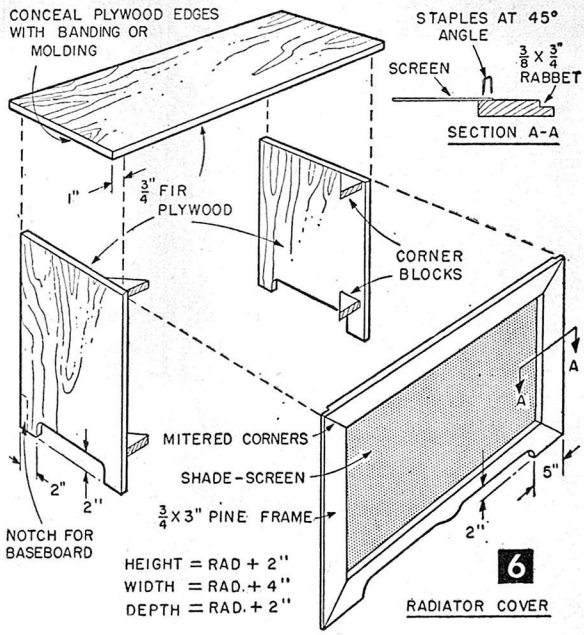




A. For best result with a rectangular lampshade, plan dimensions so you can bend along the vertical solid material rather than the louvers. B. To complete the lampshade, overlap material along selvedge and secure with soft aluminum rivets.



Since line of sight is from above, screening effectively hides radiator without interfering with circulation of warm air.



The best way to secure the material is with a hand stapler (Fig. 2). Staples should be at least ⅜ in. long and galvanized if the project is to be used outdoors. When fastening, always follow directions on selvedge of screen which indicate with words and arrows which side of screen should be *out* and which end should be *up*.

ShadeScreen doesn't have to be stretched. Once it is fastened along one edge, just pull it taut along each vertical and staple down. Parallel to the louvers, it requires no pulling at all.

Lampshades. A novel and very attractive table-lamp results when ShadeScreen is used for a lampshade (Fig. 3). To soften the light, line shade with translucent material such as plastic sheeting, or an opaque cover if lamp placement makes this advisable. Sew lining to wire frame before attaching screening.

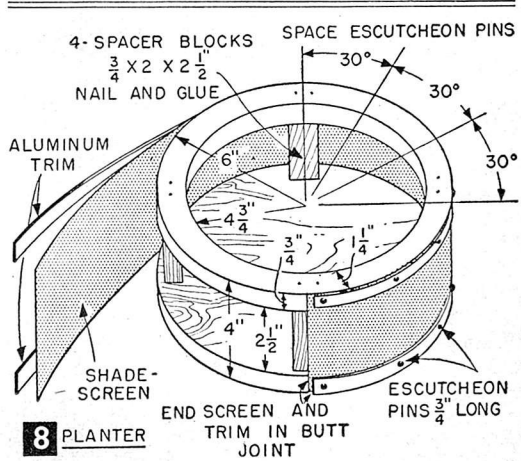
To shape a round shade, bend the screening around the frame of an old discarded lampshade. Since ShadeScreen is fairly rigid, only upper and lower rings of frame are required, and screening is laced to these through louver openings. To bend screening for a rectangular lampshade, cut a board with one edge beveled about 30° so you can overbend enough to compensate for "springback" (Fig. 4A). Lace shade to top and bottom of frame.

Overlap selvedges and punch holes for *Do-it-yourself Aluminum* rivets with an awl or leather punch (Fig. 4B). Cut rivets so they project about ⅛ in., then upset by striking with a hammer while rivet head rests on a metal block.

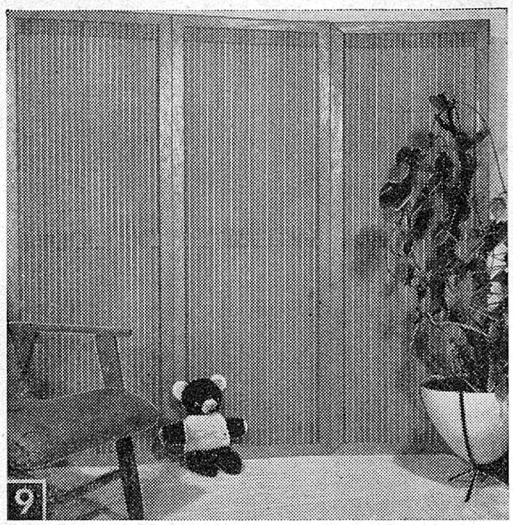
If dimensions of shade do not permit joining along selvedges, overlap one row of louvers and hold together with a line of lacing running ver-

MATERIALS LIST—PLANTER

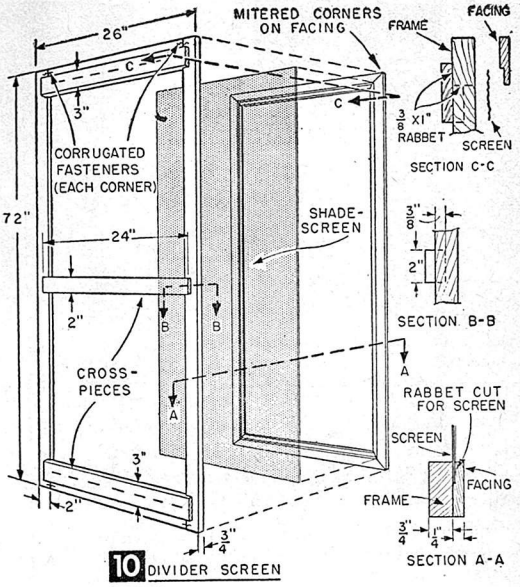
No. Req.	Description
2 pcs	¾ x 12 x 12" fir plywood
4 pcs	¾ x 2 x 2½" fir plywood
1 pc	4 x 48" ShadeScreen
2 pcs	½ x 48" Do-it-yourself Aluminum trim
1	round baking pan



ShadeScreen lends light, airy effect to planter project. Trim is *Do-it-Yourself* Aluminum.



Indoor divider screens made of louver screening add a modern touch to the home, and are practical, particularly when backed with green muslin for privacy.



10 DIVIDER SCREEN

tically down the back of the shade.

Radiator Cover. Practical and attractive for this job, the screening completely hides the radiator (Fig. 5). Measure radiator carefully before cutting any parts, figuring dimensions as described in Fig. 6. Make the front frame (with screen) as a unit, then add to the sides, reinforcing with corner blocks. Add the top and finish, painting both inside and outside of the project to equalize sealing.

Planter. Before cutting parts for this project (Fig. 7), be sure to have on hand the round baking pan which you will use as the container so you can modify size to suit, if necessary. Cut base and top ring from ¾-in. plywood with a coping saw or jigsaw, then connect ring to base with four spacer blocks, using glue and finishing nails (Fig. 8). Sand smooth and stain or paint, then staple ShadeScreen to this frame, joining in a butt joint at what will be the rear of the planter.

Pre-drill aluminum trim for escutcheon pins then, starting at the rear, bend it around tightly, nailing as you go. If trim does not completely hide screen edge, tap lightly with a hammer along top edge so it will bend in to meet wood. Cement felt to bottom of finished project.

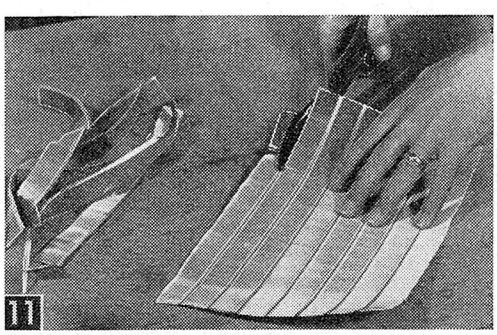
Divider Screen. Where space division is required without cutting out light, air and visibility, consider a portable or stationary screen made from ShadeScreen (Fig. 9). Start construction by cutting sides and top and bottom pieces to length (Fig. 10). Join these with glue and corrugated fasteners placed so they'll be hidden by the reinforcing crosspieces. Rabbet and attach crosspieces on the back with glue and finishing nails.

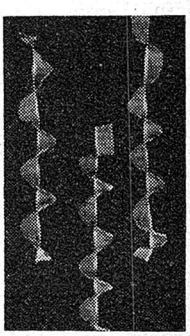
MATERIALS LIST—DIVIDER SCREEN
(For one section)

No. Req.	Description	Use
2 pcs	¾ x 2 x 72″ fir	frame sides
2 pcs	¾ x 2 x 22″ fir	frame top, bottom
2 pcs	¾ x 3 x 24″ fir	top, bottom crosspiece
1 pc	¾ x 2 x 24″ fir	center crosspiece
2 pcs	¼ x 2 x 72″ veneer, striated or etched plywood or fancy molding	facing (sides)
2 pcs	¼ x 2 x 26″ material as above	facing (top, bottom)
1 pc	24 x 72″ ShadeScreen	

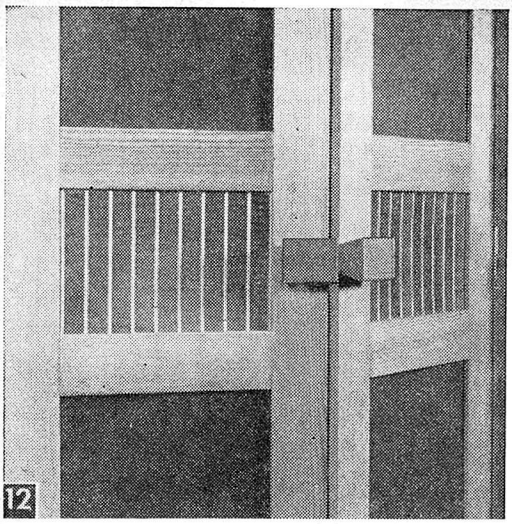
Attach screening to front, following instructions previously given, then add facing material. If privacy is important, line the back of the screen with green muslin, stretch taut and tack down. Hide the edges with thin molding. Screen sections can be held together with regular folding screen hardware, or ordinary butt hinges placed so the wings of the screen can fold in on the center section.

Novelties. ShadeScreen can even be used to make Christmas decorations (Fig. 11). To make





Cut "whirl-away" strips lengthwise, then twist to make ornaments for the Christmas tree.



ShadeScreen used as a vent for a linen-closet door. Same idea could be used in the kitchen to permit air circulation around vegetables.

"whirl-aways," which revolve prettily when slightly disturbed, cut a piece of ShadeScreen about 12 in. wide, then cut this into individual strips. One edge of strip must be secured to a vertical and the opposite edge must be free. Grip each end of vertical in your hands and twist about a dozen times. If ends are damaged from twisting, cut off, then hang ornament from fine thread.

Decorative Vents. Since this screening material is attractive and lets air through, it's ideal for venting where ordinary screening or slots might be objectional. For example, it can be slipped into the slot cut in the center section of a linen-closet door (Fig. 12) which was originally intended to hold *Masonite* panels. Fill the grooves with slim strips of wood.

Or, it can be used for crawl space vents (where traffic does not require heavy-duty material), small attic openings and sink vents. Since most of these vents are applied over a surface, it's a simple matter to make mitered frames for them having the inside edge rabbeted. The screening is cut and stapled so it lies in the rabbet.

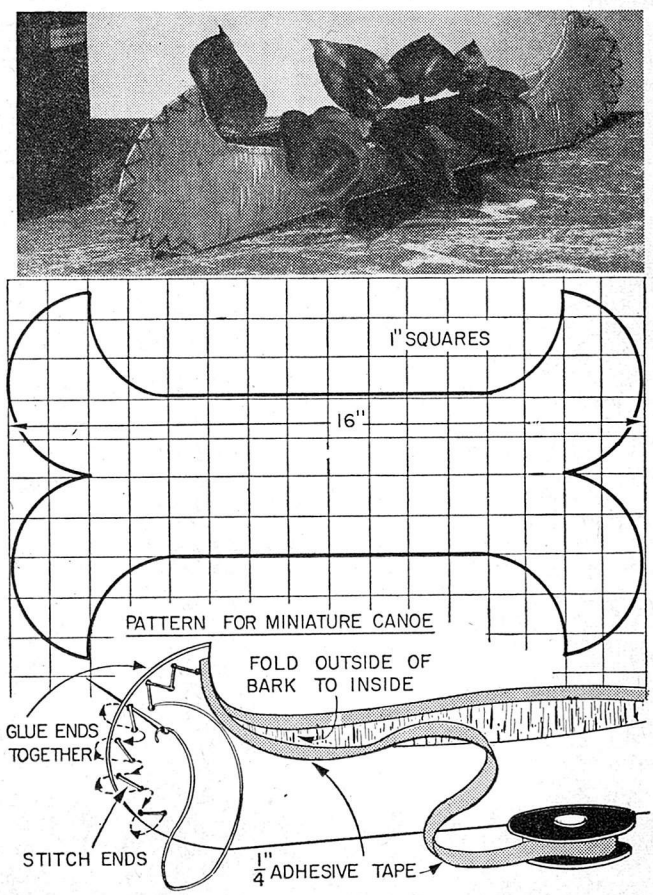
Birch Bark Canoe Planter

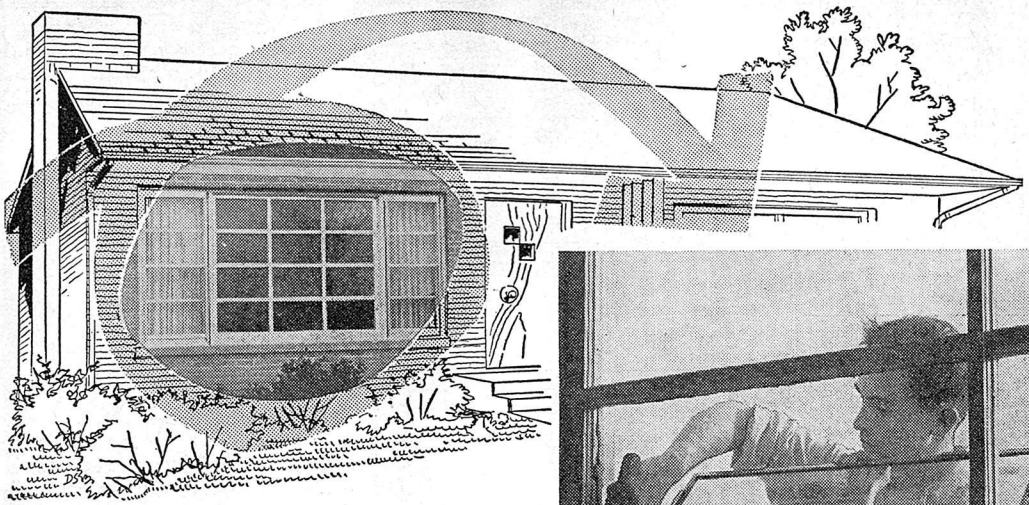
DRESSED up with a few sprigs of ivy in wet moss as a centerpiece or filled with cocktail nuts, this canoe makes a fine planter. If a few stones are placed in the bottom for ballast, the watertight birch bark will float.

Obtain birch bark from fireplace logs, lumber mill slabs, or in the woods. If tree is live, cut bark in vertical strips, not so wide as to girdle and thus destroy the life of the tree. Peel off thin outside layer of bark to provide a smooth interior for canoe.

Cut pattern any size to fit available bark. For a large-size canoe, use 1-in. squares; for a very small canoe, use ¼ or ⅜-in. squares. Lay out pattern on cardboard and cut out. Trace pattern on bark, fold ends only and cut along traced line, following natural curl of bark at edges. Trim off rough edges.

Use glue or natural pitch from a pine or balsam tree scar to glue the ends together. Thread a darning needle with carpet warp and run a simple stitch over end pieces. Then, using the same needle holes, reverse the stitch. Apply a strip of ¼-in. adhesive tape to edges, folding equally on both sides, to complete project.—NORBERT ENGELS.





Installing Your Own Thermopane Windows

Modern windows serve two purposes —they're handsome and they help keep the house cool in summer and warm in winter

By DAVID M. SWARTWOUT

Installing double pane glass in a 12 light window approximately 5 x 7 ft. in size.

DOUBLE-PANE glass installation has always been a problem for the home glazier—big panes of glass and extra heavy framing involve big expenses. But here is a way you can install small double-pane lights (panes of glass) in your present window framing with very little alteration. For a large, non-opening window with 12 or more lights, the cost of double-pane units will come to approximately the cost of a good metal storm window to cover it. The window shown here cost $118, while the price of aluminum storm windows was quoted at $113. Installing double-pane insulating units eliminates the need for storm sashes and all of the headaches that accompany them.

Begin by very carefully checking the framing for squareness and measuring the framework of each individual light. If framing is out of square it must be fixed before ordering glass. Since each piece of double-pane glass is a sealed unit, cutting the unit to fit the frame would break the seal and destroy its insulating properties. Lay out a rough plan of the window and pencil in each measurement (Fig. 1). Double-pane units are made up to size with a tolerance of ± 1/16 in., so accuracy is very important. The individual units must not touch the framework on any side. The framework is apt to change shape with atmospheric conditions, and if the glass were touching the wood the pressures thus set up might break the air seal. Setting blocks or clips are used to keep the glass away from the frame rabbet. Subtract 1/8 in. from your measurements for each side of each unit in making up your order list. For example, if the frame opening is 14¼ x 26½ in., the glass should be 14 x 26¼ in. (see Table A). Order the double-pane units (*Thermopane* is produced by Libby-Owens-Ford, *Twindow* by Pittsburgh Plate Glass Co.) through your local hardware store or glass company. Sears, Roebuck and Montgomery Ward also sell double-pane insulating glass.

Check the width of the existing rabbet. It should be about 5/8 in. (if you are using two 1/8-in. panes with ¼ in. of dry air space sealed between them) to allow for 1/16 in. or more of glazing compound on the inside of the glass and between glass and cap or molding. If the rabbet is 1 in. or more, use ¼-in.-round molding to hold the units in place (Fig. 2).

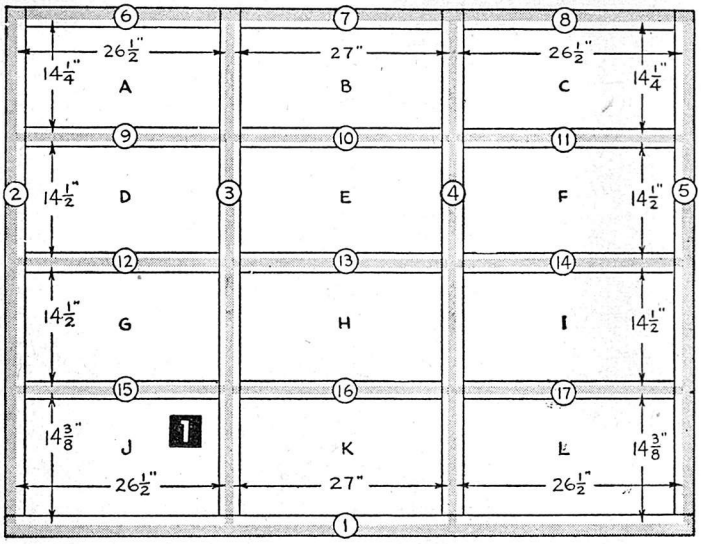


TABLE B—CAP STRIP LENGTHS

No. of Units	Piece Number	Approx. Length
1	#1	7' 6"
4	#2, 3, 4, 5	5' 6"
3	#6, 7, 8	30"
9	#9 through 17	30"

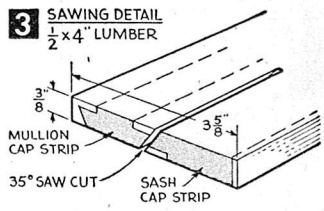
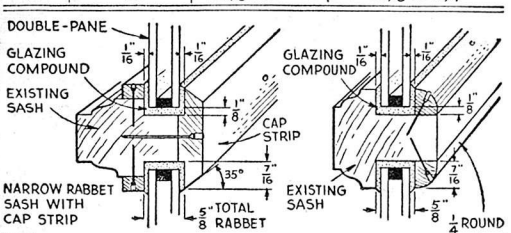


TABLE A—OPENING AND GLASS SIZES

No. of Units	Opening	Size (inside of rabbet)	Glass Size (⅛" clearance all 4 sides)
2	A & C	14¼ x 26½"	14 x 26¼"
1	B	14¼ x 27"	14 x 26¾"
4	D, F, G, & I	14½ x 26½"	14¼ x 26¼"
2	E, H	14½ x 27"	14¼ x 26¾"
2	J, L	14⅜ x 26½"	14⅛ x 26¼"
1	K	14⅜ x 27"	14⅛ x 26¾"



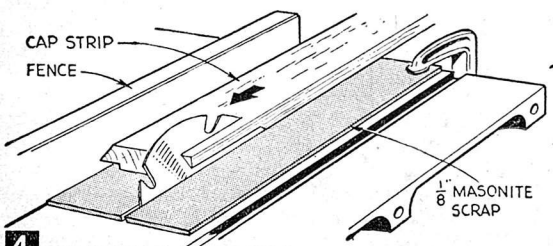
2 GLAZING DETAILS

If you are not using molding, sketch in the various cap strips you'll need to cover the outside mullions on your window layout and number them (Fig. 1). The approximately 5 x 7-ft. window shown here required four ½ x 4-in. x 6-ft. pieces of white pine, with two strips cut from each piece (Fig. 3). One additional piece (¾ x 4 in. x 8 ft.) was needed for the bottom apron. The long strips should run vertically, to avoid miter inlets for water, with the short pieces running horizontally between the verticals. At the lumber yard personally select each piece of clear white pine, for a minimum of waste. Total lumber costs on this project will be about $7.

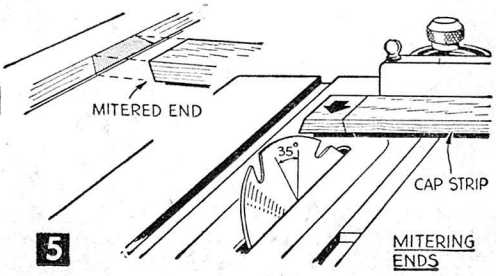
Figure the width of the cap by adding 7/16 in. for each flange to the width of the mullion. Cut the cap strips for the mullions. Cut the side, top, and bottom strips the width of the side, top and bottom sashes respectively, plus ⅜ in. for the flange. If the existing rabbet is less than the width needed (Fig. 2), rabbet out the cap strips as needed with dado or molding head on your circular saw. The total width of the sash rabbet plus the cap strip rabbet should be ⅝ to 11/16 in. to receive the double glass unit I used. If you have no power tools you can make cap strips from clear white pine. Carefully measure the width needed and plane the strips to size. If extra rabbets in the cap strips are needed, a local lumber yard or cabinet shop will probably do the job for a very nominal fee.

Set the saw at a 35° angle to bevel the cap strips. Run a piece of thin plywood or *Masonite* into a saw between the fence and blade (Fig. 4), and clamp to the saw table so that there will be no danger of a finished bevel sliding under the fence while cutting the opposite bevel. Before changing the angle of the blade, cut the cap strips roughly to length with the square on the circular saw, allowing an inch or so for scrap (Fig. 5). Unless the circular saw is fairly close to the window, a miter box will be needed for fitting the strips (Fig. 6).

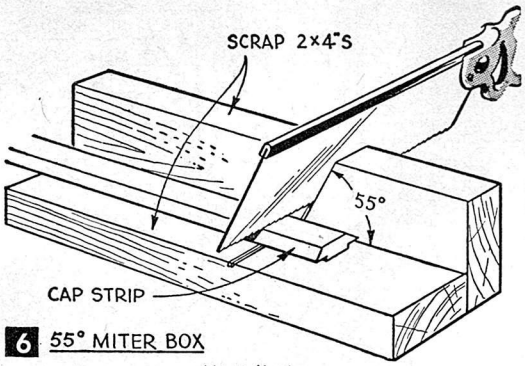
Cut and fit the strips over the present frame before removing any of the old glass. Fit the



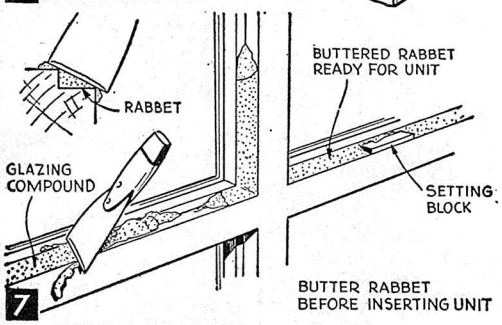
4 CUTTING BEVEL ON CAP STRIP



5 MITERING ENDS

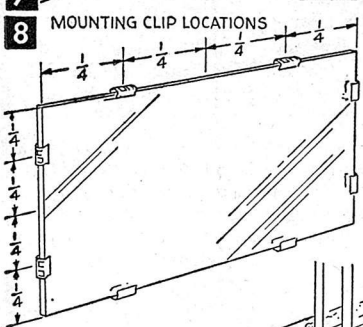


6 55° MITER BOX



7 BUTTER RABBET BEFORE INSERTING UNIT

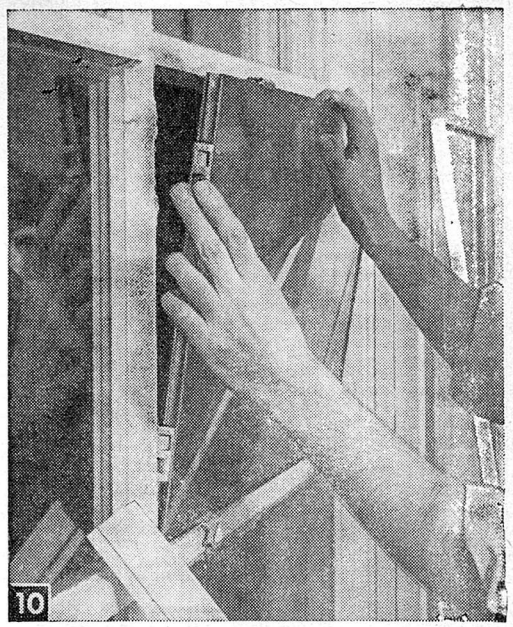
8 MOUNTING CLIP LOCATIONS



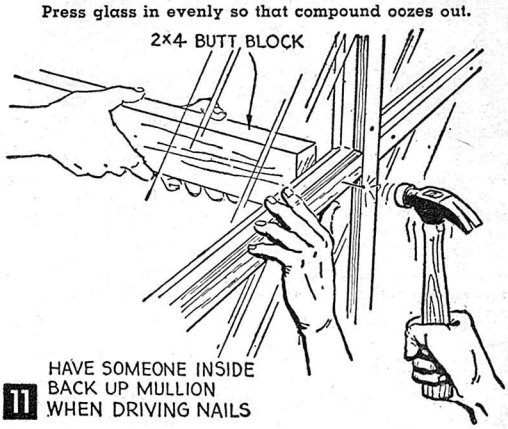
9 FILL GAPS BEFORE ATTACHING CAP

base strip first, then the long verticals, placing the mitered ends against the bevel of the base strip. Secure with one 3*d* finish nail driven part way in at each joint. Next, fit and trim the short top and cross pieces to size with your back saw in a special miter box (Fig. 6). Nail them in place as you did the long strips. Key them by numbers according to your layout, then remove and give each a base or prime coat of paint—to back side and ends as well as to face of the wood.

To insert your double-pane units, remove one of the old panes at a time starting at the bottom and install the new unit before removing the next light. Remove old putty and glazing points from rabbet with a screwdriver or other tool, then give rabbet coat of quick-drying lacquer to seal the wood. Next, butter the rabbet (Fig. 7) with a good non-drying glazing compound and putty knife. Locate the setting blocks



10 Press glass in evenly so that compound oozes out.



11 HAVE SOMEONE INSIDE BACK UP MULLION WHEN DRIVING NAILS

(must be at least the thickness of double-pane unit) or clips (obtain from your glass dealer) ¼ in. of the width in from each end. Place the bottom edge of the units on the setting blocks and press the unit in evenly, allowing equal clearance between all edges and sash. Clips equalize the clearance automatically (Fig. 8). Fill all edge spaces between glass and sash with compound (Fig. 9). The sash or mullions *must not* come in contact with the glass unit at any point. See Fig. 2 for correct spacing of glass in sash. Insert rest of units and clean off excess compound before putting on the cap strips.

Back up the mullion (Fig. 11) and drive one finish nail along the cap strips every 6 to 8 in. Set the nails below the surface and fill holes with compound before the final painting.

With the cap strips all in place, fill in the gap with compound and point up all the edges. A good coat of outside paint to match the rest of the house trim finishes the job.

Well organized linen storage in this 4-ft. closet depends on wire shelves 11½ and 16 in. deep plus a full length wooden shelf mounted on special brackets. At this slight angle, post slots which hold all shelves are not visible. Racks can be moved up or down in inch modules to suit the space requirements of the moment.

The same 4-ft. closet with "working wall" fitted as a utility area. Shelves are attached to brackets from underneath by ½-in. wood screws. Brackets of metal or wood are moved up or down on the lockstrips to fit dimensions of supplies. Perforated hardboard is bolted to right-angled wall mounts which fit the lockstrips.

Shelf Magic for Stuffed Closets

How to make that limited space do multiple duty—all without scarring the walls

MANY a so-called overcrowded closet really isn't—it just seems that way whenever you hunt for something in an unclassified pile of clothes, boxes, cans or what not.

With the adjustable shelves shown in Figs. 1 and 2, and other matching accessories, you can organize the storage in any closet and provide more room by eliminating waste space. And as seasons shift and the family grows, you can change the layout promptly without a single new nail or screw hole in the wall to worry about.

Hidden Supports Do the Trick. Accessories include various types of shelves, brackets, hangers, hooks, racks—even attachments for sliding door cabinets, drawers and desk tops. All lock firmly into side-flanged steel posts extending from floor to ceiling and slotted every inch.

The posts are virtually concealed from view by the nominal 2 x 8-ft. treated hardboard panels they hold in place. Panel ends wrap around the posts to leave only the slotted portion exposed in a recess ⅛ in. wide and deep. All components make up the Masonite Panelok wall system, now available in many lumber yards and building supply houses. Only three posts, called lockstrips, and two panels are required to cover the rear wall of a 4-ft. closet (Fig. 3A). Four lockstrips and three panels will handle a 6-footer. Panels are supplied in a choice of four wood-grain

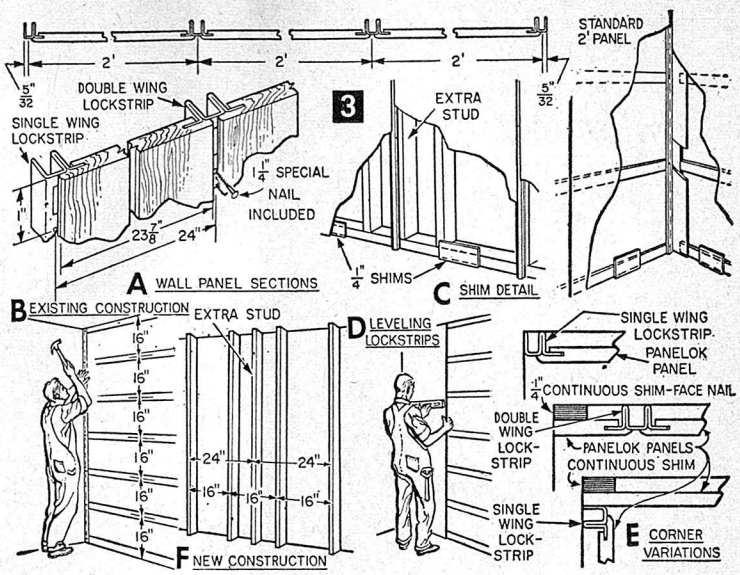
finishes, either random-grooved or ungrooved, as well as with a smooth, unpainted surface.

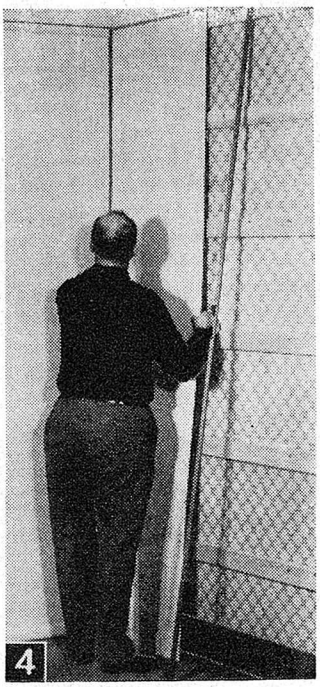
To Build the "Working Wall" in an existing closet, first determine location of the lockstrips, which are to be spaced on 24-in. centers. If closet width is 4 feet such as in Figs. 1 and 2, or a multiple of 2 feet (plus 5/16 in. for clearance), the posts will start at the corners. If closet has some other width, you might still start at a corner and leave some open space at the other end, or you may prefer to center the lockstrips and cut a panel to piece out corners.

Install 1 x 2-in. furring strips horizontally on 16-in. centers as in Fig. 3B, after aligning top and bottom strips with position of lockstrip ends. Level each strip, shim as necessary to get a true plane and fasten firmly to wall studs with 8d common nails. For masonry walls, use drive pins, expansion shields or some other type of mechanical anchor.

At one edge of the new wall area, position a single wing lockstrip with flange to the inside. Make plumb with your level and fasten with the special threaded nails furnished, nailing through each of the 7 prepunched holes as in Fig. 3B. Nail ¼-in. thick shim pieces cut from scrap hardboard or plywood to top and bottom furring strips midway between lockstrip positions, as in Fig. 3C.

Now you can position a panel onto the lockstrip flange as in Fig. 4 and insert flange of a double wing lockstrip on other side (Fig. 3A). Before fastening this lockstrip, make sure slots are even with the preceding post so that fixtures will be level when mounted. A good way to do this is to insert shelf mount





Sliding first panel into position on lockstrip flange in corner of closet. Double wing lockstrip at right, to be installed next on a 24-in. center, completes job of holding panel in place.

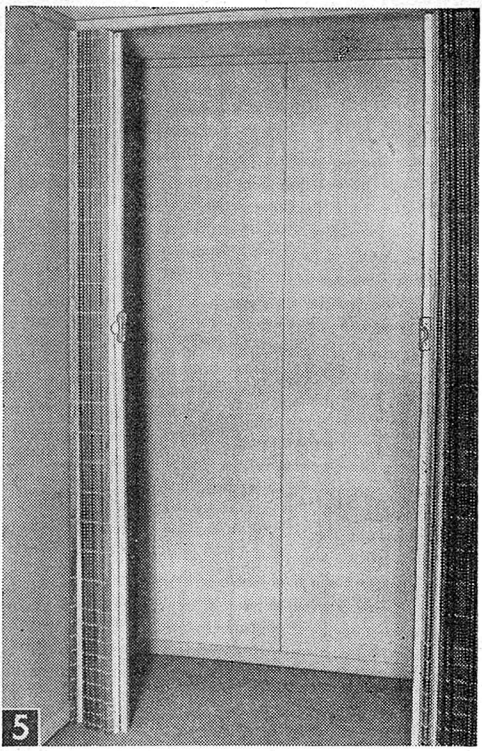
brackets in two corresponding slots. Place your level on them for a reading as in Fig. 3D, shifting the second post until aligned. Install screws with post 24 in. o.c.

Position shim strips and the next panel in the same manner, but if this is the last panel for the wall and will extend to a corner, add the end lockstrip to it first. If panels have no end lockstrip, put continuous shim behind them as in Fig. 3E. Install trim at ceiling and floor joints and your new closet wall will be ready for finishing and attachment of accessories, as in Fig. 5.

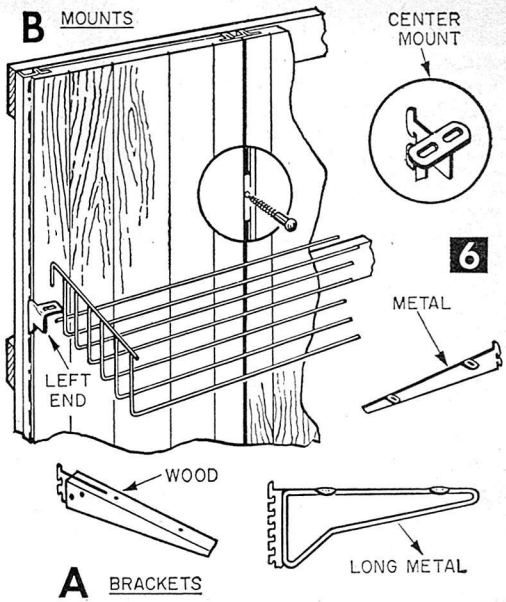
In new construction, position studs 24 in. o.c. Where 16-in. spacing is required, put in an extra stud at the 24-in. location as in Fig 3F. You will then need no furring strips, but can nail lockstrips directly to studding.

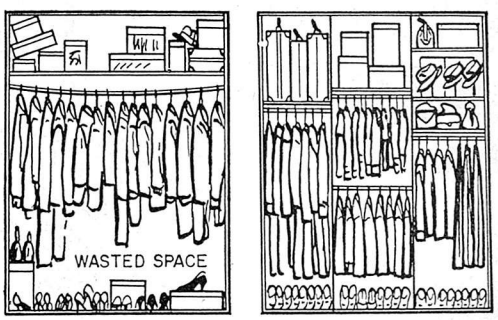
Let Attachments Fit Your Needs. Once you have installed matching trim at ceiling and floor joints, your new closet wall will be ready for final finishing and installation of accessories.

If you used unpainted panels, treat them with any wood finish to match or harmonize with the rest of the closet or the room it serves. Use a primer or sealer first, then one or two coats of oil, water-base, latex or resin emulsion paint. If wood-grained panels are



The completed "working wall" in 4-ft. closet, ready for attachments which can be connected in minutes to the hidden lockstrips. Nothing is fastened to any wall surface.





on the wall, protect their surface with clear varnish, lacquer, shellac or wax. Apply finish first to an out-of-the-way part of the panel or a piece of scrap to be sure desired effect is obtained.

While there are dozens of different attachments, most all attach to the closet's working wall in one of two basic ways: either directly to the lockstrips or indirectly by means of mounting clips. Brackets of wood or metal intended for use with wood shelving clip directly to the wall, as in Fig. 6A, and the longer sizes have extra slot hooks for increased support. Wire shelves, racks, etc., do not need a separate bracket but hook into small shelf mounts previously set on the wall, as in Fig. 6B.

A major difference between the two types of shelving is that a slot can handle but one bracket at a time while it can take either an end or center shelf mount. Thus, wire shelves which are all the same width as the panels (Fig. 1) can be aligned or separated at will, while wooden shelves installed in widths of 2 or more panels can be moved only as a unit.

The accessories are especially effective in a bedroom closet which had one overworked, sagging clothes pole. Hangers designed for 2-ft. racks can be placed at whatever levels are dictated by the length of clothes, to minimize waste space. A hanger rack for blouses and shirts and a special holder for skirts or trousers, for example, can fit together on one panel, as in Fig. 7, and there's still room for a shoe rack with floor space for additional shoes below that.

Where enclosed space is desirable, you can provide a 4-ft. cabinet by slipping shelf brackets into lockstrip slots, fastening shelving, then applying an aluminum or golden track fascia to the forward edge. Slip in plastic doors—which are 25 in. wide to insure overlap on a 24-in. modular basis—and enclose any open ends with shelving. The doors are available in 13 or 20 in. heights. Track design permits stacking of one cabinet over another.

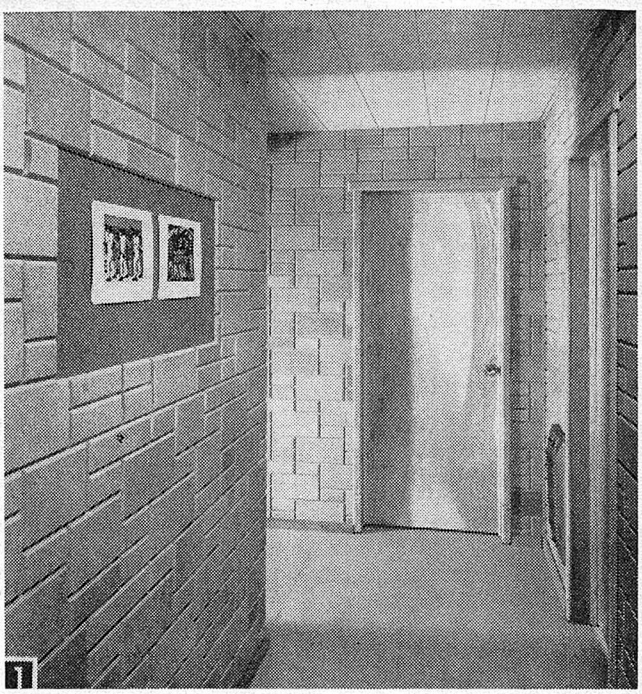
Among the other attachments are wire hat holders which clip onto any uncovered part of a rack and adjust to hold hats wherever they will fit best in the space available.

CUT STONE INTERIOR WALL COVERINGS

By R. J. DeCRISTOFORO

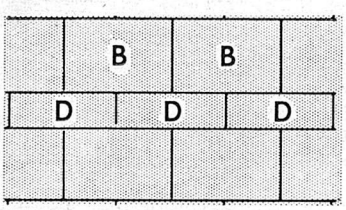
LONGING for one of those expensive cut stone walls? If so, give this material a double take (Fig. 1). Both beauty and durability are in *Novoply,* a pressed wood chip panel, and it is much less costly than real stone. Available wherever lumber is sold, Novoply is attractive in its original state, and when cut and used as in Fig. 1, its resemblance to cut stone is remarkable.

From the suggested sizes and designs in Fig. 2 select a pattern (or prepare your own). Measure the area to be covered, deducting for doorways and windows. We used the coursed patterned ashlar design (Figs. 1 and 2). Each complete pattern covers an area about 15 by 30 in. (slightly more than 3 sq. ft.). So for an 8 by 10 ft. wall you would need about 27 complete patterns which you can cut from 2½ of the ¾ in. 4 x 8 ft. sheets, each costing a little under $15. Scout lumber yards for Novoply scraps. We did this and covered the walls of a rather large hallway for about $16.

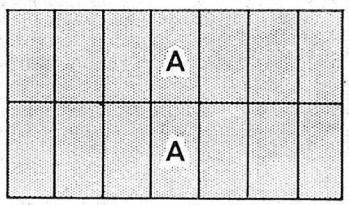


1 Here's a "stone" wall made of Novoply cut into blocks to form an ashlar pattern.

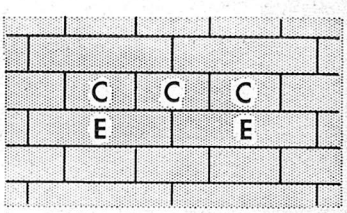
Ripsaw the Novoply sheets into seven 6 in. by 8 ft. strips and one strip narrower by the width of the saw cuts. Use a combination blade with set teeth for the appropriate rough edge. Crosscut two of the strips into 12-in. pieces and cut another half dozen 12-in. pieces from a third



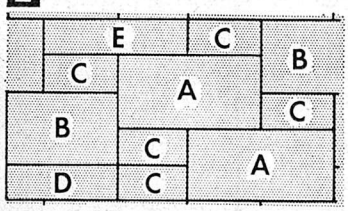
2 COURSED ASHLAR



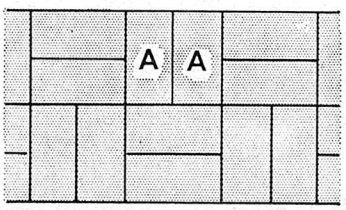
VERTICAL STACKING



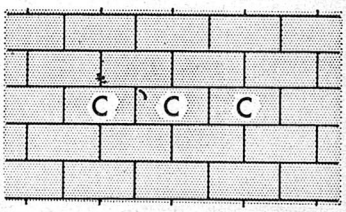
RUNNING BOND



COURSED PATTERNED ASHLAR (FIG. 1)

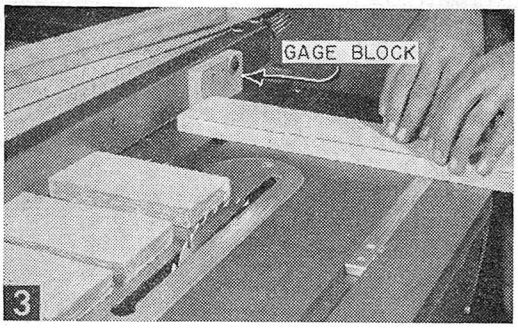


BASKET - WEAVE

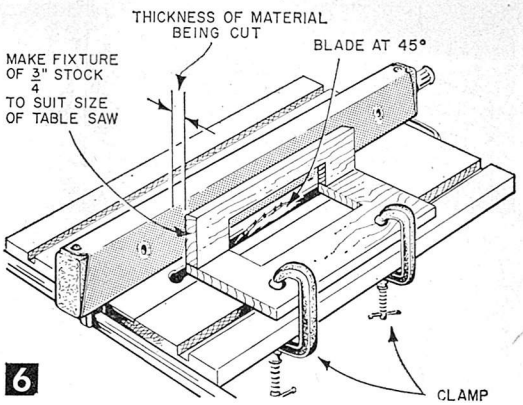


RUNNING BOND

The six designs above can be made from pieces of the following size: A, 6 x 12 in.; B, 6 x 9 in.; C, 3 x 6 in.; D, 3 x 9 in.; E, 3 x 12 in.



When cutting off pieces to length, use this setup to insure accuracy.

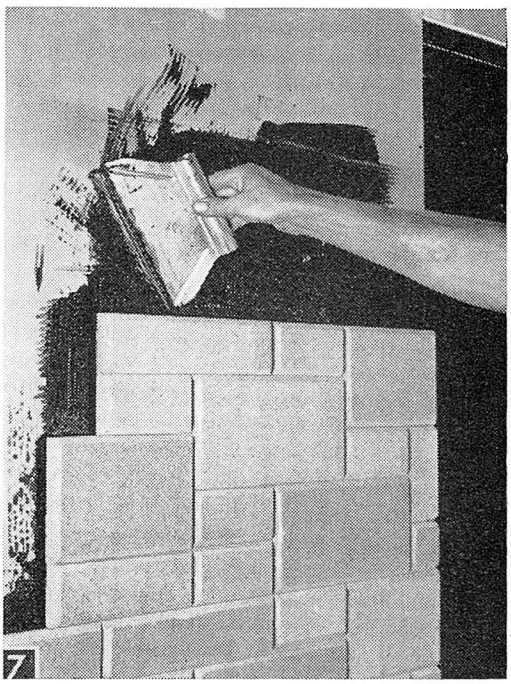


strip (Fig. 3). Crosscut two other strips into 9-in. pieces and the remaining strips into 3-in. pieces. With these plus the remaining material you should obtain about 10 patterns from each full sheet.

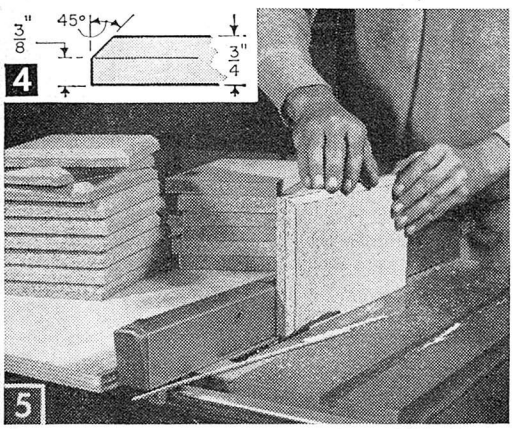
If you're working with other designs, cut out the larger pieces first (6x12s and 6x9s), then the smaller pieces. Save all strips two or more inches wide for fitting purposes.

After all blocks are cut, tilt the saw blade to 45° and chamfer the four surface edges of each block (Figs. 4 and 5). To keep fingers out of harm's way build the fixture shown in Fig. 6 for chamfering the smaller blocks. Then just move the pieces between the rip fence and the fixture.

The wall requires no special preparation other than to be sure it's sound. Sheet rock is a good base and if you're now installing it, don't worry about covering joints and nail heads. If it's an old painted wall, score through the paint to insure a good bond for the adhesive. Evenly apply the linoleum cement adhesive with a regular spreader (Fig. 7), covering area about twice the size of a pattern. After this becomes tacky, put a small dab of the cement in each corner of the block, then place block on the wall slightly away from its position, press firmly,



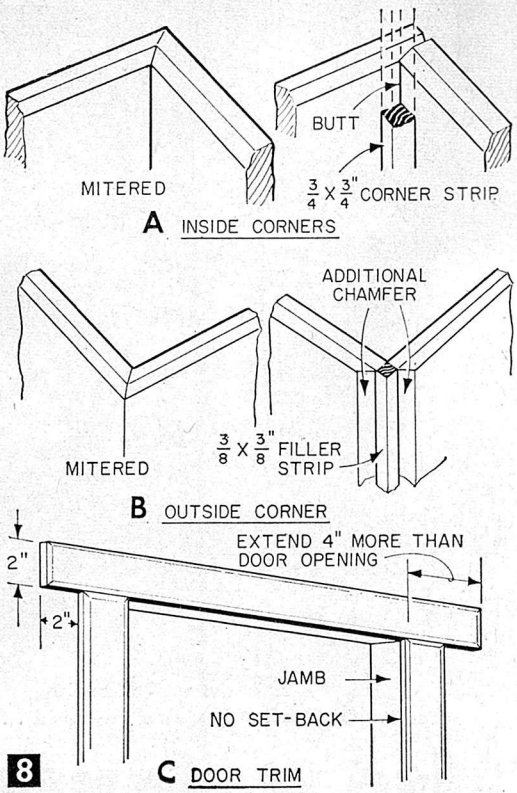
Use a spreader to apply linoleum cement to wall. Don't put on more than you can cover with the next two patterns.



Chamfer the larger pieces as shown, but make the fixture in Fig. 6 for the smaller ones. Combination blade provides suitable rough edge.

and slide carefully into its proper place.

Lay the first course directly on a finished floor; elevate it above a sub-floor the depth of finish floor so the latter can be butted against the wall. At openings, such as doors, cut the blocks off or use odd pieces for fitting. Work up, continuing the pattern across the top of the opening. Miter inside corners as in Fig. 8A. If the walls are square you can easily cut the last block in a miter and make it turn the corner. If the wall is not square, or if you prefer, mount a vertical ¾ by ¾-in. corner strip, then cut the blocks off square and butt the remainder to turn the corner. Treat outside corners (Fig. 8B) similarly, except that if you "butt" around the turn, chamfer the edge of the block that must

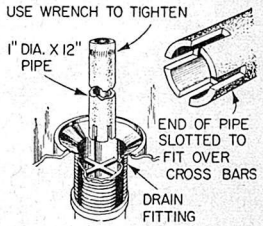


be cut and then fill in with a small square strip. This attractive corner is much less difficult to accomplish than a mitered joint.

Door trim should be made of the same material (Fig. 8C) with strips cut 2 in. wide and chamfered on all four surface edges. Attach any recess material, such as the cork insert shown in Fig. 1, before the Novoply is mounted. Then cut the blocks to fit as you work around.

Finishing depends on the effect desired. We left our "stone" wall natural because we didn't want to darken the material or impart any gloss. A clear dull-finish lacquer makes a good protective finish without excessive darkening and provides some gloss. A penetrating sealer will darken the material and produces a cork-like texture which you may prefer. Experiment on scrap stock first, then decide.

Pipe Tightener



• Bathtub and lavatory drain fittings are usually difficult to tighten except by turning the top section into the lower or trap section. To do this easily, cut four notches in one end of a 12-in. length of 1-in. water pipe. Place notched end of pipe over cross bars of drain fitting to tighten it from above.—VICTOR H. LAMOY.

"Here's a new item for people who want things done quickly."

Structurally sound bungalow was raised . . .

How to Raise a House

Adding a foot to its height helped owners upgrade 40-year-old cottage to top neighborhood status

By MARV M. FRYDENLUND

IT WAS structurally sound and well-located in an established community. Like many other cottages of its 1920 vintage, no single big thing was wrong with it. Rather, there was a variety of lesser faults: some the results of advancing age, others originating with the house design, and still others due to increased family requirements.

Most of the faults hinged on an uneven, too low, and partially crumbling foundation. Thus, the house was both ripe for modernization and worthy of it. The owners adopted an eight-step program centered around raising their home 1 ft. as in Fig. 1 to make practical the elaborate remodeling partly shown in Fig. 2—as good and livable as many new, narrow-lot bungalows.

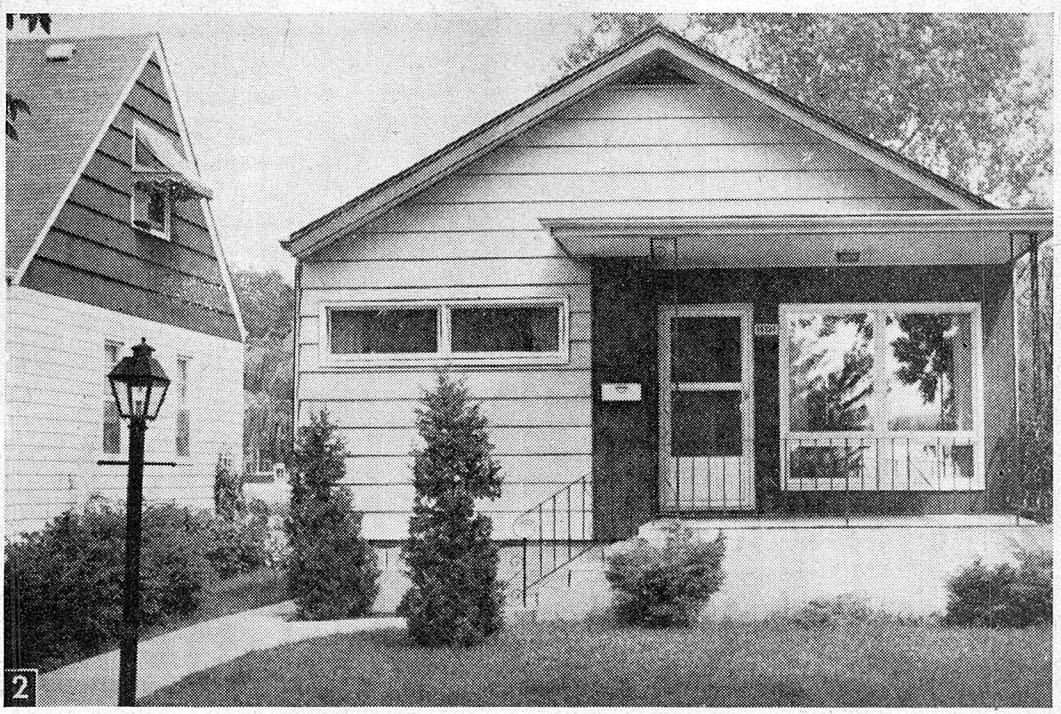
By doing most of their own planning and work, they succeeded in transforming one of the lowliest houses in the neighborhood to one of the best. If your house is equally venerable or of similar design, their problems and successful solutions, cited below, may help your own planning and actual remodeling.

Faults and Remedies. There was too little headroom in the basement—only 7 ft. 4 in. from floor to ceiling joists while a poured concrete foundation reaching up to grade level was in good condition, two courses of an old-style decorative-face concrete block above that were crumbling. And, the basement floor was cracked, pock-marked, and dusty from use of a poor concrete mixture.

To solve these basic problems, the house was raised 12 in. by replacing the two courses of old block with three and one-half courses of new block. This increased headroom to 8 ft. 2 in., after subtracting the 2 in. taken up by a new concrete floor poured over the old. The owners wanted the extra headroom, plus a good floor and walls for a second bathroom and a recreation room to be built later.

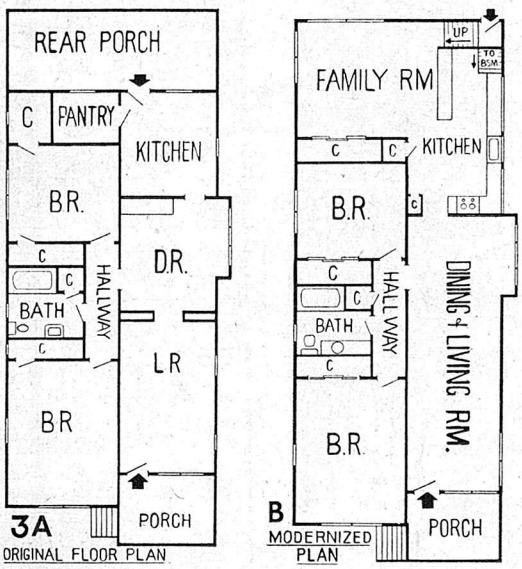
Originally only 24x46 ft. (Fig. 3A), the house was getting cramped, even for the small family. A family room and a bigger, modern kitchen was wanted.

This problem was solved by tearing off the back porch—which was in need of repair, anyway—and extending the house itself out over the 12 extra feet of length thus gained.



. . . to make this transformation practical.

to Modern Standards



Fortunately, the original builder had prepared for eventual closing in of this porch by building the basement the full 58-ft. depth of house plus porch.

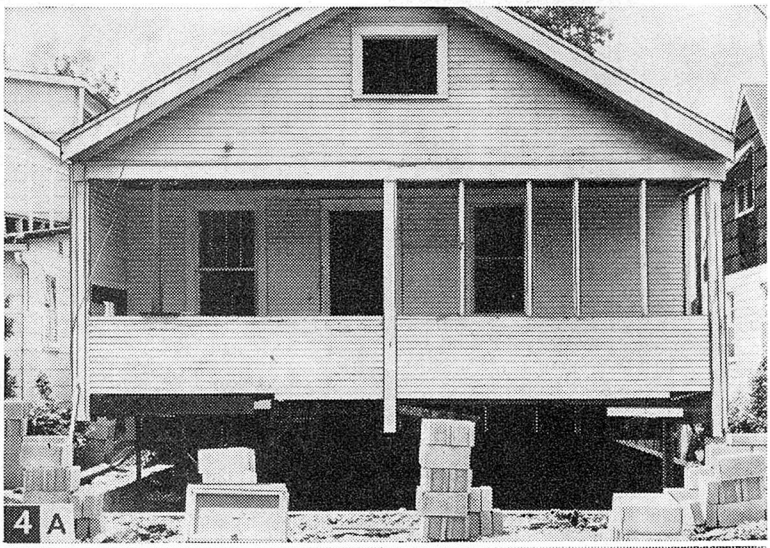
In addition, the owners went practically all the way to house renewal by replacing the roofing with new asphalt shingles; replacing the narrow wood siding with new wide-panel hard board siding, installing an entirely new forced warm-air heating system, replacing bath fixtures, refinishing walls, putting in new kitchen cabinets, and even installing air conditioning.

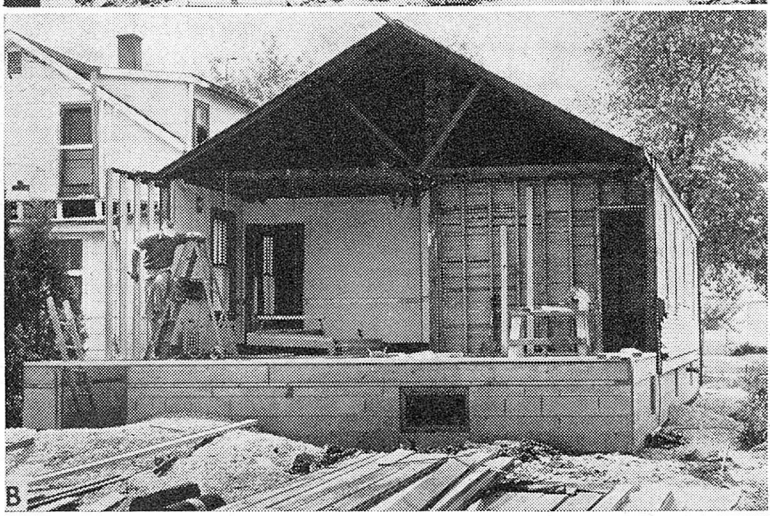
They estimate that total cost, not counting their own labor, was far less than would be required to build as good a house in an equal neighborhood.

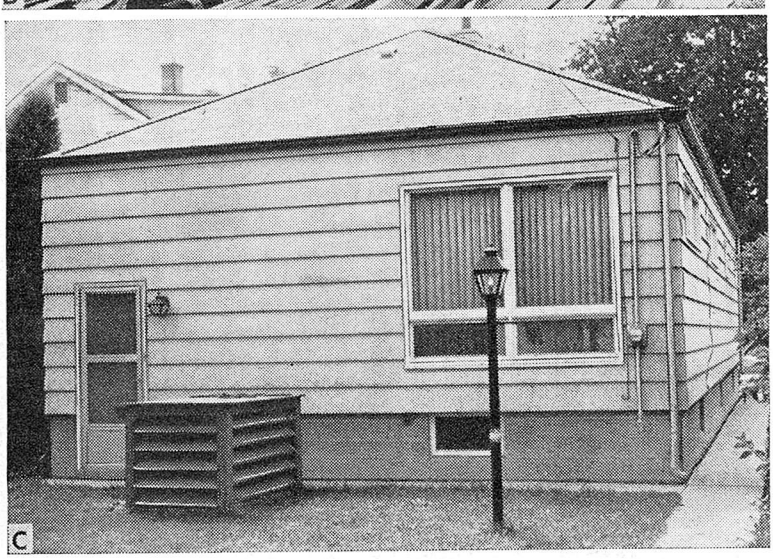
Although your project may be dissimilar in many respects, you may wish to follow some of the eight steps developed for the raising of the house. Here they are:

STEP 1—Planning. The owners first listed ailments of the house and brought them to a materials supplier who helped diagnose troubles and suggest solutions. If you prefer to do your own planning up to the point of making a finished floor plan, follow this procedure:

Measure the existing house—outside dimensions and those of all rooms in their exact locations. View it from the standpoints of convenience of traffic pattern, space use, and location of kitchen, bath, and utilities in relation to living area and bedrooms. Consider what privacy it has for the family as a group and for its individual members.







Rear of the house had a covered porch (top), which simplified expansion plans for new family room and enlarged kitchen. Old porch was torn off back to original exterior wall of house (center). Some of porch framing and subflooring was reused to build addition. With rebuilding complete (bottom) door at grade level opened onto landing leading down to heightened basement and up to the family room at right.

In making these checks, you will automatically start listing the faults of the house as you see them. Continue this list from the standpoint of appearance and with a long view ahead to possible future needs.

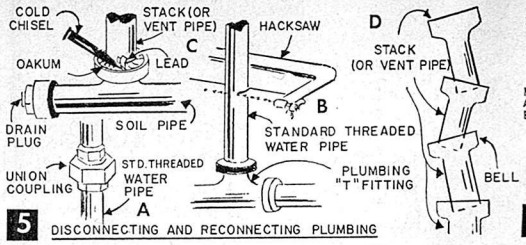
When down in black and white, match these problems against the good points of the house, its location, design, and construction. Ask yourself:

1. Are the neighborhood and other houses good enough to warrant the possible overall cost of remodeling? Remember that it's not good business to have a high-quality house in a low-cost neighborhood. Still, if you like the latter well enough, financial considerations wane in importance.

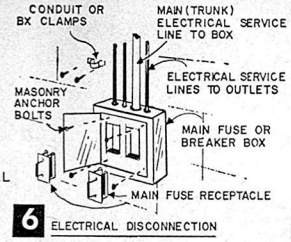
2. Will the house give us what we need at a price we can afford?

3. What compromises must be made between what we want and what we can get?

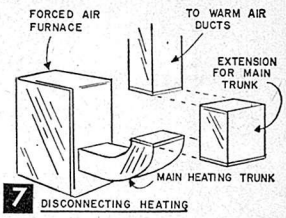
If you can answer these questions to your satisfaction, take your plans, sketches, notes, and list of problems to your materials dealer. Try to get all the help and advice you can while also getting a competitive price on



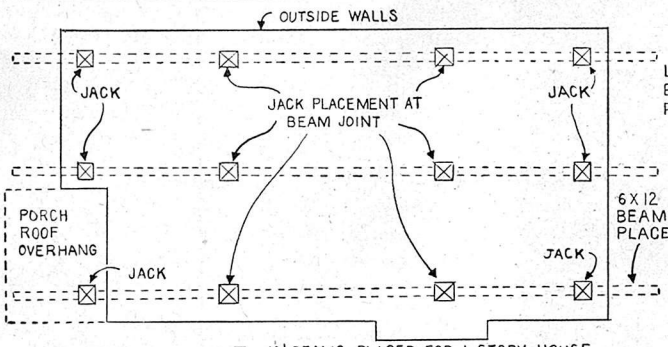
5 DISCONNECTING AND RECONNECTING PLUMBING



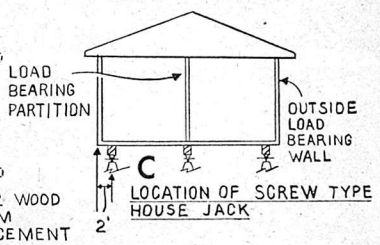
6 ELECTRICAL DISCONNECTION



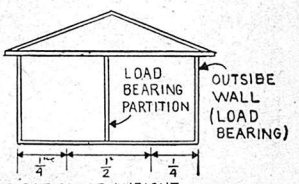
7 DISCONNECTING HEATING



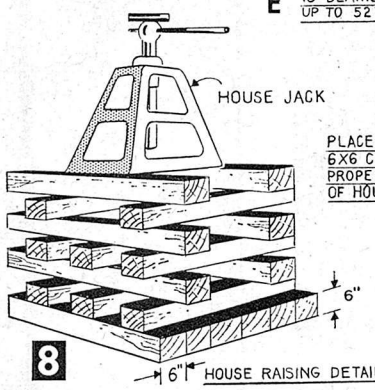
E 18' BEAMS PLACED FOR 1-STORY HOUSE UP TO 52' LONG



C LOCATION OF SCREW TYPE HOUSE JACK

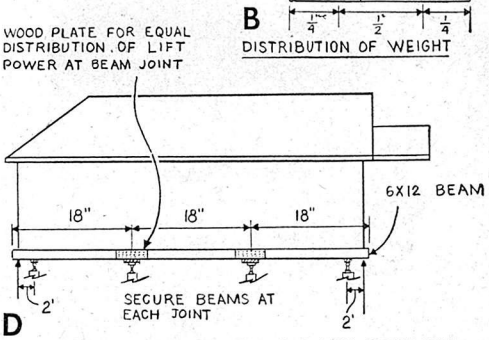


B DISTRIBUTION OF WEIGHT



A PLACEMENT OF 6X6 CRIBBING FOR PROPER SUPPORT OF HOUSE JACK

8 HOUSE RAISING DETAILS



D CROSS SECTION DETAIL OF BEAM AND JACK PLACEMENT

materials. You may also be able to obtain free working drawings from the dealer with whom you do business.

STEP 2—Disconnecting Utilities. Here is a checklist of seven disconnections to be made:

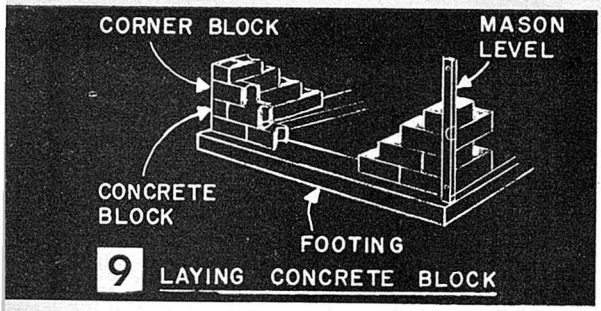
1. Main fuse box and any additional electrical lines fastened to the basement wall which travel to the first floor.
2. Main warm air trunk—or all ducts at plenum—and cold air return to the furnace.
3. All water lines extending from the wall or floor to first floor, including hot and cold water pipes, and hot water heating pipes or tubing.
4. Drains and soil stacks for bath, kitchen, laundry, outdoor taps, and other water sources.
5. Thermostat wire to heating plant, unless it has enough "give."
6. Telephone wires, unless they are attached only to house framing.
7. Basement stairs. Remove these completely because dimensions may change enough to make it impractical to use them again.

Here are main procedures for making these disconnections:

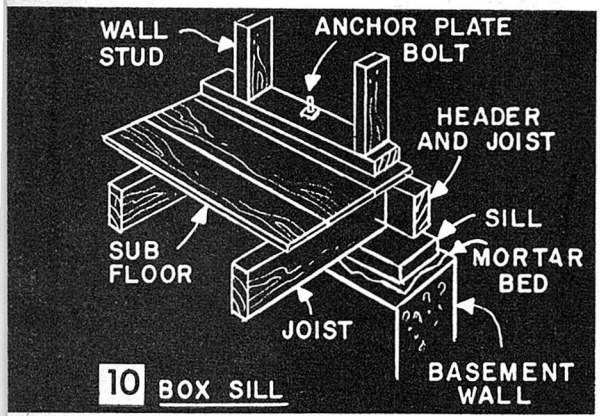
PLUMBING (Fig. 5)—Drain water lines by closing the supply valve and opening the lowest sillcock. Locate a union coupling (Fig. 5A) to separate the line. If there is none, cut the line with a hacksaw at least 6 in. from a threaded joint, as in Fig. 5B. Thread the lower end of the cut pipe for re-connecting after the house is raised. Use a union coupling and the proper length of threaded pipe (available at a hardware store) to complete the alteration.

Handle vent and drain piping of smaller diameter threaded pipe in the same fashion. Copper tubing is easy to cut, reflare, and reconnect with a simple flaring tool and connectors.

For cast-iron soil pipe, remove lead and oakum as in Fig. 5C from the bell joint located closest to the floor and from the next higher bell (or next two bells, depending on



9 LAYING CONCRETE BLOCK



10 BOX SILL

height of house raising). Store the pipe sections and obtain one more section from which to cut off a length equal to the distance the house is to be raised. Replace sections as in Fig. 5D and when all are in place, tamp in oakum and re-lead.

ELECTRICAL (Fig. 6)—First, pull the main switch to cut off the current. It's a good idea to have the utility company cut off power altogether until after the house is back on its foundation. Next, remove all brackets, screws, anchor bolts, or other attachments holding the service box to the wall so that box is actually suspended by electrical lines (conduit, BX, or Romex), from the house framing.

HEATING (Fig. 7)—For warm air heating, simply find a convenient joint on the main trunk or individual ducts and dismantle. Distance the house will travel determines the length of duct(s) to be replaced. In reassembly, have a sheet metal shop make up any pieces you may not be able to buy and cut with tin snips. Dismantle and reassemble hot water heating.

STEP 3—Raising the House, the biggest and most critical step though not necessarily the longest-duration job. Many do-it-yourselfers have successfully raised houses with less painstaking methods. If you are at all uncertain about it, by all means hire a carpenter to help you, or most any kind of contractor from mason to house mover.

In this example, professional house-raising jacks and wood beam cribbing (Fig. 8A) were readily available, as were long heavy beams and ample advice. While these are too expensive to be worth while buying unless you plan to go into the moving business, jacks, beams, and cribbing can be rented from large tool rental shops and some building supply houses, as well as from the moving firms.

First important point to consider is load distribution along the width of the house. Figure 8B shows that half the total house weight will be at the center and the other half will be divided between the sides.

One row of jacks should be located under a beam directly under the center load-bearing partition, as in Fig. 8C, while two other rows of jacks are placed under beams set in 2 ft. from the sides of the house. With sufficiently large beams, enough jacks all brought up together, and proper cribbing, this gives you the best weight distribution, working room, and safety.

Caution. *This advice and that to follow is given on the basis of a one-story house of the size described in this article. It has been checked out for adequate strength and safety by an engineer. If you plan to move a larger or multi-story house, check with a local authority and follow his advice.*

Jacks should be spaced according to size of the wood beams available. For example, 18-ft. long 6x12 beams can be used for a house up to 52 ft. long (Fig. 8D). This requires 12 jacks and 9 beam sections as in Fig. 8E. If only smaller beams are available, more jacks must be used. However, if 8x16 beams are available, engineering specifications allow a spacing of up to 22 ft. In actual practice, there are variations.

You can build up cribbing of 6x6 lengths as in Fig. 8A, or short beams of other dimensions. If concrete block is used, each tier should have four blocks stacked so the pier is tied together vertically. But, *use of concrete block is not recommended for non-professionals.*

Remember these critical points:

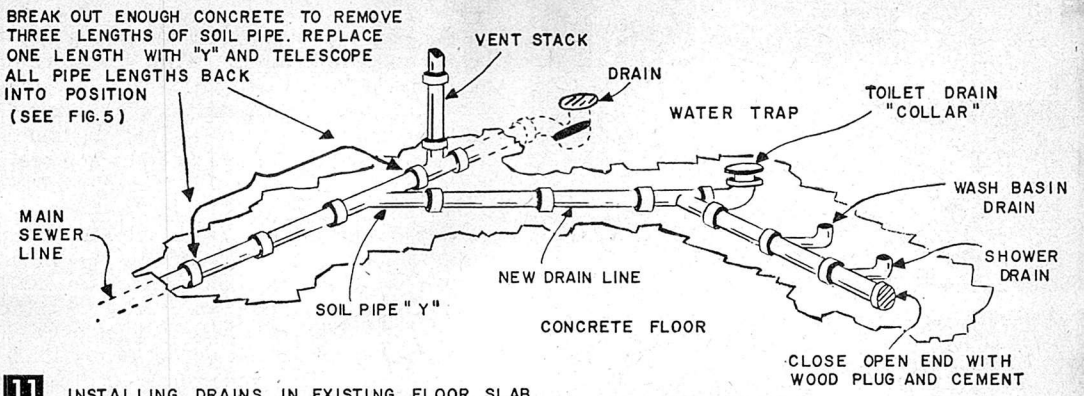
1. Use a single turn or less per jack and go from one jack to the next so that the house will be raised level.

2. Be sure that cribbing rests on an even, sufficiently strong base or, alternately, that cribbing is sufficiently large and shored to compensate.

3. Don't use the existing girder as a house-raising beam unless judged exceptionally strong. Instead, shore up joists on both sides and replace the girder with a regular raising beam.

4. Finally, check locally if there is any deviation or question on your part.

Cribbed jacks should also be used to raise porches or other house extensions along with the house itself, as in Fig. 1.



11 INSTALLING DRAINS IN EXISTING FLOOR SLAB

STEP 4—Foundation Rebuilding. Now you can remove that part of the foundation which is in unacceptable condition, or repair it preparatory to adding more courses of concrete block. In this example, two courses of block were removed and the top of the concrete wall cleaned. Then three courses of full 8-in.-high block and one course of 4-in.-high block were installed atop the concrete wall to bring the basement headroom to the desired 8 ft. 2 in.

Lay up blocks in piers at the corners of the structure first, then string a line and fill in intermediate points as in Fig. 9. If unsure about your mortar joints, however, lay the first course dry for spacing purposes. Mortar should be one part Portland cement to three parts of clean sand. For a whiter joint, replace 10% of the cement with hydrated lime.

Leave out blocks at the house-raising beam locations as in Fig. 1 so the structure may be set down on the foundation. Frame window openings with end blocks (one end flush).

After the foundation wall is up, install a sill of at least 2x6 (nominal size) in a mortar bed atop the wall. Anchor it with ⅝-in. bolts on 6-ft. centers as in Fig. 10.

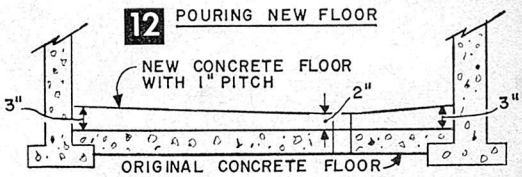
STEP 5—Resetting the House. After the mortar joints have been given a day or two to cure, screw the jacks down with quarter to full turns. The more evenly this is done, the less chance there is of racking the framing and causing wall cracks or other damage.

Once the structure is down, you can remove the jacks, pull out the beams, and fill in the remaining foundation openings with block.

STEP 6—Adding to Utilities. Rough in the additional plumbing and wiring, and reassemble the severed lines as in Step 2.

When installing a new plumbing line for a basement bath, as was done in this example, the existing concrete floor must be broken up so that piping may be laid deep enough for proper drainage (Fig. 11). Breaking up the concrete may be a sledge hammer and cold chisel job or an air hammer task, depending on condition of the concrete.

12 POURING NEW FLOOR



If possible, locate the bath near the main sewer line to keep installation work at a minimum. Slope the line from ⅛ in. to ¼ in. per foot of run. Install plumbing as in Fig. 11. *(Ed. Note*—Complete details on do-it-yourself plumbing are contained in S&M Handbook No. 615, available for $1, including postage and handling, from SCIENCE and MECHANICS, 505 Park Ave., New York 22, N. Y.)

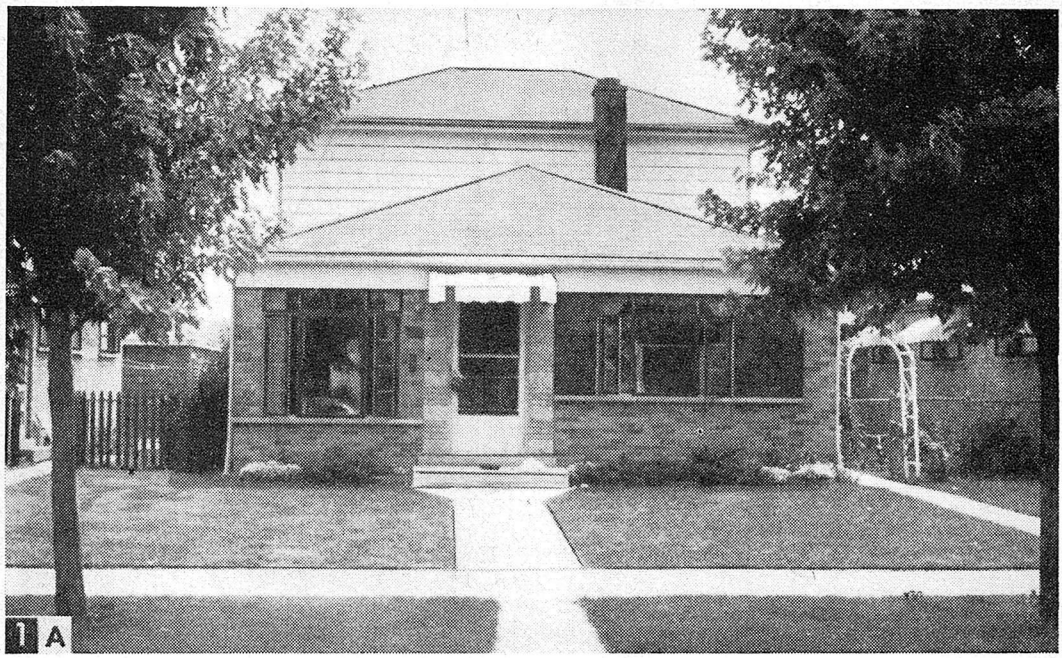
STEP 7—Pouring a New Floor. Applying new concrete over old is a job you may wish on professionals because smooth troweling of a large area such as a basement floor is both difficult and risky. Unless you are quite well experienced, you will not have enough time between the moment of the pour and setting-up of the mix to make a smooth surface.

If you want to hose down your basement floor or wash it down as a regular part of cleaning, you'll want to install a floor drain.

STEP 8—Changing the Extensions. This is simply the job of tearing off old porches, canopies, or other extensions which are to be converted or replaced. Normally, this is done before a house is raised, but in the project described here, framing for the old porch was integral with the house understructure. It was thus retained and actually left in place for the new family room addition.

Once the eight steps to house raising have been completed, your home will be ready to proceed with additional remodeling you may have planned as a result. This may include framing, sheathing, roofing, siding, insulating, trimming, finishing, and/or painting. Except for location and other differences, these tasks are the same in principle and detail as those described in "How to Raise the Roof for Extra Living Space," starting on p. 140.

How to Raise the Roof



1 A

Street profile of brick veneered hip roof ranch house typical of many small postwar homes. A new partial second story with two bedrooms and bath was added by owner.

Step by step sequence helps you plan the construction and finishing of a new addition to your home

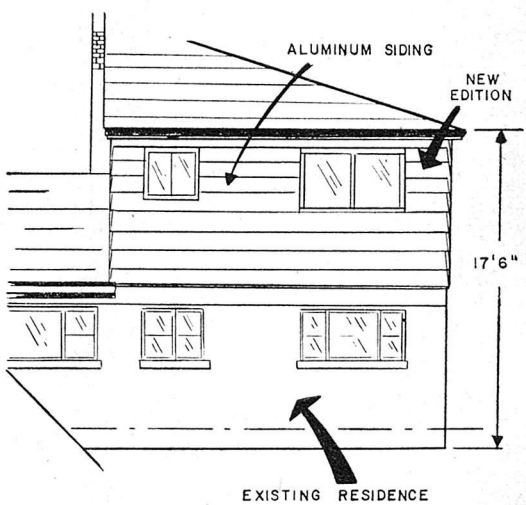
By MARV M. FRYDENLUND

IF YOUR not-so-old homestead is beginning to feel a bit bulged by the family and its space needs, it might be a good idea to raise the roof of your otherwise peaceful abode.

The home in Figs. 1A and B was a typical postwar ranch house with three bedrooms, living room, kitchen, utility room, and bath shoe-horned into 1000 sq.ft. of space on a lot adequate only for the existing house and outdoor living requirements.

Problems were typical, too: Three bedrooms were simply not sufficient for a growing family. Moreover, one of the bedrooms was only 11 ft. 8 in. x 8 ft. 6 in.—and at that it lacked a closet. The living area, 17 ft. x 11 ft. 8 in., was too modest-sized for comfortable entertaining of guests.

Because the house had no basement, an extra large utility room was required, putting a space squeeze on livable area. Even so, the accumulation of possessions that mark a family with children going into teenage independence made storage woefully inadequate, particularly for clothing.

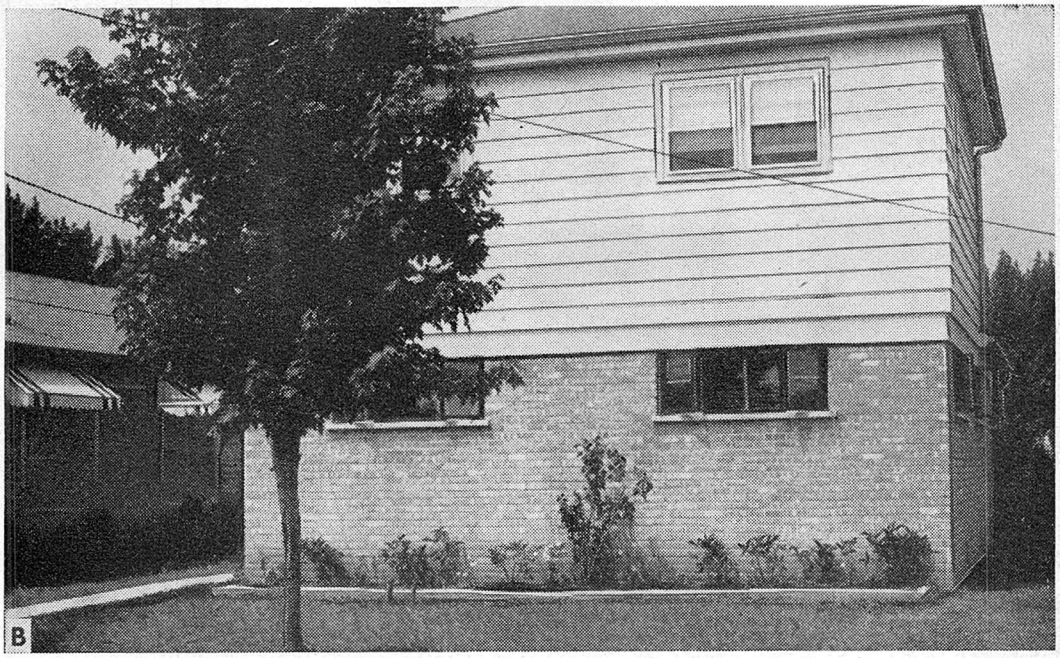


2 A (RIGHT SIDE ELEVATION)

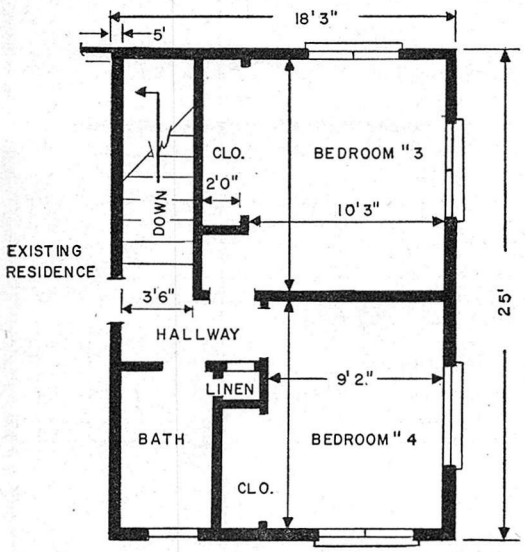
Finally, the family was fighting the common battle of the morning bottleneck at the bathroom door. One bath was not sufficient.

The owner faced three alternatives: (1) sell and move, an unappealing possible solu-

for Extra Living Space



From the rear, the enlarged home looks like a two story structure, with windows above closely matching windows below. Aluminum siding was brought down to extend over trim board above original brick veneer.



B SECOND FLOOR ADDITION (FLOOR PLAN)

tion because both parents and children had sunk their roots deep in the community; (2) build outward with a room or wing addition —also an unacceptable solution because it would use up too much of an already small back yard; and (3) build upward by placing a second story atop the existing one.

Alternative No. 3 was selected, although it presented problems of its own. The two main ones were the trouble and expense of taking down the roof structure to rebuild it one story higher, and living inconveniences while the addition was being built overhead.

Still, this alternative would keep the family in its established location. Backyard cookouts and other activities would not suffer from reduction of outdoor space. By careful planning, both major problems were satisfactorily solved.

With some free professional guidance from a materials supplier, the owners designed a second-story addition just large enough to provide what they envisioned were their specific space needs.

This included two extra bedrooms with ample closets, a second bath, and a stairway to the addition (Fig. 2). Thus expense was limited to building an addition of 18x25 ft. With the owner doing the major part of the work and reusing some roof framing materials, even greater saving was achieved.

The second major problem, that of disrupting the household while work was in progress, was kept to a minimum by scheduling steps in proper sequence. The existing superstructure was removed and the addition was framed and roofed over as quickly as possible. One large window was left as a rough

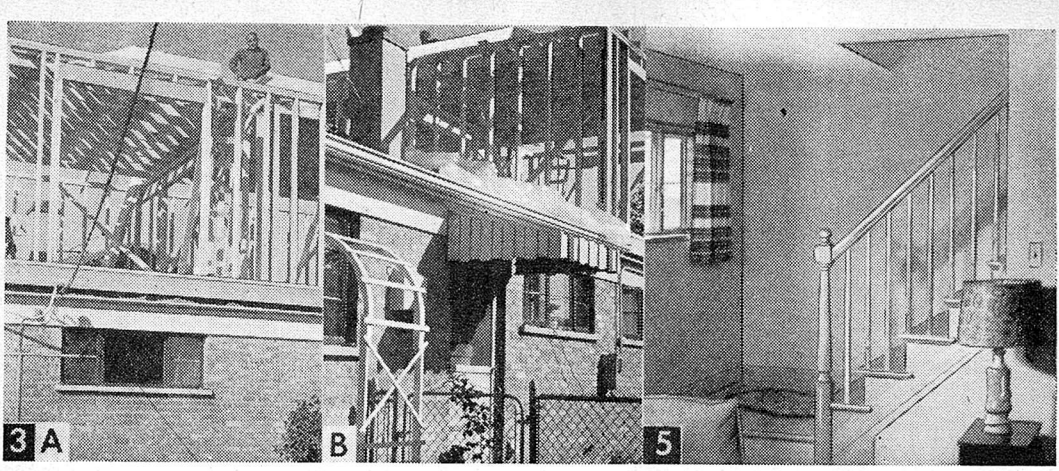
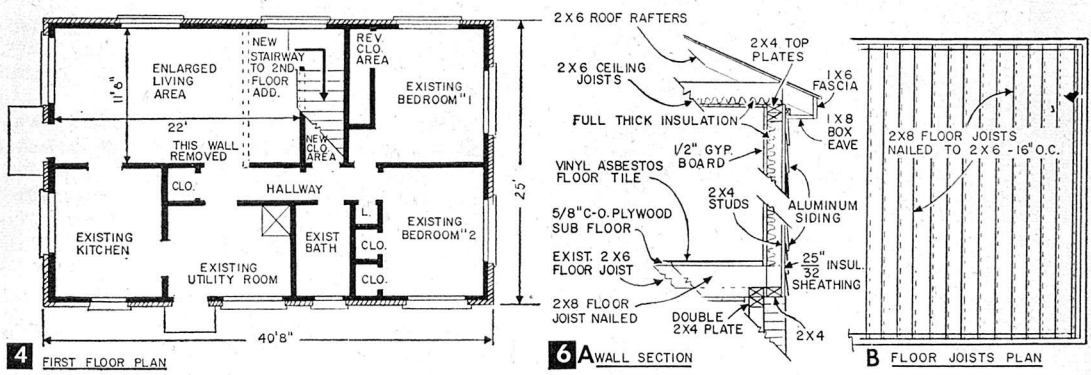


Fig. 3A: Here's how house looked midway through framing phase. One of the rough window openings was left unfilled to allow building materials to be brought in without going through first floor. Fig. 3B: Side view of framing. Fig. 5: L-shaped stairway to upstairs bedrooms has exposed railing and newel post.



opening so that material could be brought in through it instead of through the house (Fig. 3A). And building of the stairway was delayed until last.

In this way, the downstairs was virtually undisturbed during most of the project. Existing paint, finish, and furniture were spared the chips and the knocks bound to occur when building materials are carried through living quarters.

In adding two bedrooms upstairs, it was possible to lengthen the living area to 22 ft. by removing the wall that formerly separated it from the smallest bedroom (Fig. 4). The stairway to the new bedrooms (Fig. 5) was built in a corner of the enlarged living room.

Plumbing for the new bathroom was simplified by locating this room directly above the existing bath, thus saving time and material. Heat runs were extended from the existing forced warm air furnace to the new addition. And while they were at it, the owners increased electrical service capacity from 60 to 100 amperes.

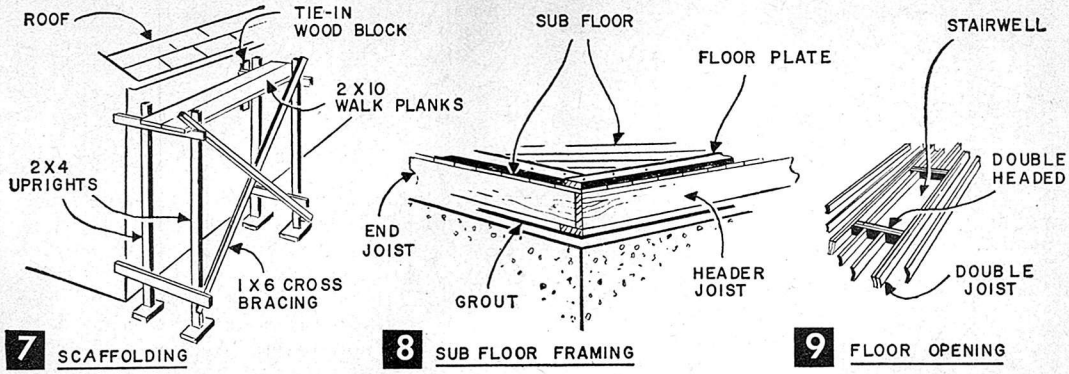
Put Your Plans on Paper. If raising the roof in a like fashion can solve similar problems for you, your planning should include careful and detailed study to assure that the addition meets the needs without expensively exceeding them.

Conversion can be done in stages. In this example, the second story was added to only the rear 18 ft. of the house. However, the stairway is located so that any time in the future the second story can be extended over the entire structure.

After taking careful measurements of existing floor space and considering various room arrangements for the second floor addition, put your ideas in sketch form. Floor plans and elevation views can be drawn most easily on paper that is cross-ruled in ¼-in. squares. Each square can represent a square foot of space.

Draw in location of the chimney, soil stack vent pipes, outer walls, of course, and interior load-bearing partitions. Then add the exact position of the proposed stairway, any relocated partitions on the first floor, and partitions, windows, and doors upstairs. The plan should show the proposed position of bathroom fixtures, beds, switches, convenience outlets, lights, and heating outlets.

Best appearance is achieved by sizing



7 SCAFFOLDING

8 SUB FLOOR FRAMING

9 FLOOR OPENING

windows in the addition to conform to those below, and locating the new windows directly above the existing ones. Greatest economy is made possible by building load-bearing partitions above those walls which presently carry the roof weight.

When your plans are all on paper, you can save time and perhaps prevent an error or two by getting an experienced, structural draftsman to prepare detailed working plans. When getting competitive cost estimates, try to base them on the same materials, quality, grade, and size. If you intend to do the work yourself, your lumber dealer will help you figure the materials needed.

Check Ceiling Joists. Before any work is started on the addition, existing ceiling joists should be checked because wider joists will alter head-room dimensions, if they are to be installed. Where conversion was not anticipated at the time of building, only 2x6 ceiling joists may have been used. When spaced at the customary 16-in. centers, joists of this size should not have a span longer than 7 ft., if they are to carry a minimum floor load of 40 lbs. per sq.ft. with safety.

Depending on span, 2x8 or 2x10 joists will take the load of added rooms. Sometimes existing ceiling joists can be strengthened sufficiently by doubling their thickness with new joists of the same size nailed to the old. However, in most cases where the joist structure must be strengthened, wider joists are installed. These may be placed alongside (Fig. 6) existing joists and nailed to them, or separated from them.

To install extra joists between existing ones, it will be necessary to remove bridging. New block bridging is installed later, except in cases where joists are intentionally separated to minimize noise transmission. To raise joists above keyed plaster, they can be set on blocks of uniform thickness, nailed either to the plates or to the joists. The ends of joists usually must be cut off at an angle to clear the roof sheathing.

Joists that support a bathroom floor should be capable of holding a load of 60 to 70 lbs. per sq.ft. because of the added weight of plumbing fixtures, and perhaps also a ceramic tile floor.

Dismantling the Old Roof. After plans for the addition are crystallized, the second step is to tear down in preparation to rebuild. This is easiest when done by two men above and a helper below to stack those materials that can be reused. Tear down in reverse order from the sequence under which the house was built.

In this example, a portable scaffold was used, but you can build your own of 2x4 uprights which may be later used for framing partitions—after the exterior is completed (Fig. 7). Walk planks may be borrowed or purchased as cull material from a lumber yard.

There may be slight variations according to the construction of your house, but here is the ordinary sequence of removal. You'll need a nail puller, both a thin, flat chisel and cold chisel, crowbars, hammers, and possibly a hacksaw.

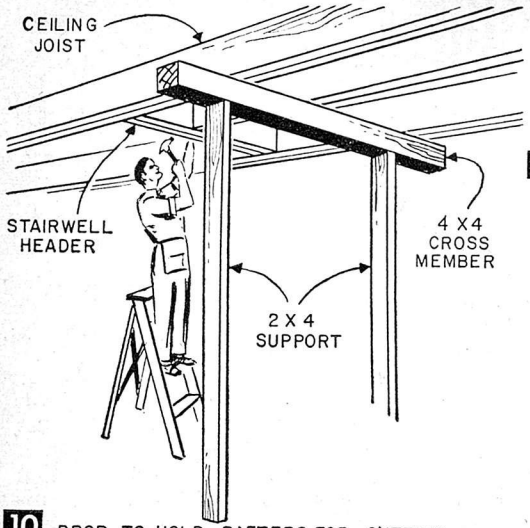
Starting from the bottom, remove downspouts, then gutters, fascia board, and other attachments like TV antenna and ground wire. With the fascia off, you can get at the soffit to pry it off.

Next, shingles should be removed. If you are doing the work yourself and time cost is not a factor, nails can be pried out carefully to preserve good shingles for reuse.

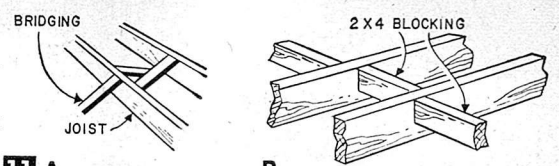
Next, and probably the toughest job, is to remove the roof sheathing. With the framing thus opened up, collar beams, rafters, and any knee-wall studs are easily pried loose to be stored for reuse.

If gable end studs are extensions of the wall studs for the first story, mark and saw these at the same height, if possible, as the sidewall studs. Thus you can build a new subfloor platform for the second story that is similar to that used as a deck for a modern home's first floor (Fig. 8).

In the example illustrated, the existing house was brick sided, and this provided a slightly different reframing situation (Fig. 6A) than for the more common non-masonry wall (Fig. 8).



10 PROP TO HOLD RAFTERS FOR CUTTING



11A BRIDGING **B** BLOCKING FOR PLYWOOD SUBFLOOR

With the roof stripped off, you'll be in a hurry to extend the framing and get the new structure under weather protection. In areas of frequent rain, or during periods when snow is likely, it is wise to plan on covering the work for protection—particularly if you are doing the work with little help. If you can't borrow or rent enough large tarpaulins for covering, a good alternative is to buy sheets of polyethylene film, as wide as you can get them, and improvise an easily erected and dismounted tentlike frame to provide a water runoff slope.

Framing the New Structure. The third step—framing the new structure—is started by building the floor platform. As mentioned previously, it is unlikely the existing ceiling joists will be strong enough for a new role as floor joists.

In building the platform, extend the joists within 1⅝ in. of the outer edge of existing framing, and install a header as in Fig. 8, using 20*d* nails. It's easiest for a do-it-yourselfer to use joists that extend from one side of the house to the other, and this is possible if the width of the house is not more than 26 ft.

Stairwell opening and any other opening between floors must be framed out with additional supports (Fig. 9). It will probably be easier for you, unless you've had considerable experience, to install all joists first and then go back to cut out the openings. The reason is that locations of existing ceiling joists determine where you place the additional, stronger floor framing members.

Prop up the joists to be cut from underneath, as in Fig. 10. Then mark your opening across the joists and on the underside of the ceiling. It's best to saw the ceiling material from below, and the joists from above.

The cut ends of the joists should be supported by double headers of the same stock as the joists. If there is no regular joist on one side of the opening due to manner of spacing, install a double trimmer joist at that position. Trimmer joists should not be doubled until after the header joist has been put in place and nailed to the single trimmers. The reason is that your 20*d* nails are not long enough to give the header adequate support.

Bridging should be installed for every 8 ft. of joists. These may be 1x3s cut with a bevel at each end (Fig. 11), or may be metal bridging pieces obtained at your dealer.

Laying the Subfloor. After floor framing is completed, the subfloor is laid. It can be of subfloor grade plywood, or of either straight-edged or tongue and groove lumber.

Unsanded structural grade interior type fir plywood, ⅝ in. thick, makes for a strong, even, and quickly installed subfloor. Lay the 4-ft. wide panels so that the face grain is at right angles to the joists. Fasten the plywood with 8*d* nails on about 6-in. spacing along the edges, and 12-in. spacing in the panel's field.

Edges of the plywood should center on joists wherever possible, or on either block bridging or 2x4 stock installed between the joists (Fig. 11B). Stagger blocking slightly so they may be end nailed through the joists. Provide blocking for plywood edges between joists.

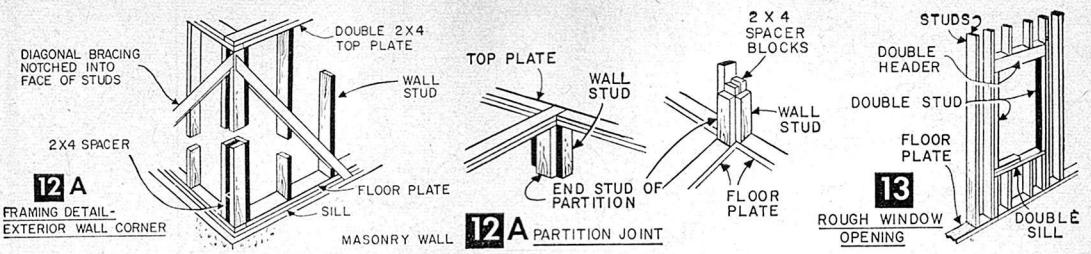
Tongue and groove stock may be end-matched so that the joining edges will lock together—and the boards need not be sawed off to center on joists.

A subfloor of 1 in., end-matched, tongue and grooved stock should be nailed with two 8*d* nails for a board width up to 6 in., and three nails for widths over that. Such subfloor should be laid diagonally for greatest strength, and to lay finish floor either way.

Subfloor boards should be squeezed together as tightly as possible if green, or in humid weather when they may have expanded. Under dry conditions, they should be assembled loosely to prevent buckling with more humid weather.

Whatever material you use, take the small bit of extra time necessary to use spiral or ring-groove nails—which do not loosen like ordinary nails and will help keep your floor from squeaking.

Framing Exterior Walls. When the subfloor is in place, the next piece of work is framing of exterior walls. For this, obtain



12 A FRAMING DETAIL-EXTERIOR WALL CORNER

12 A PARTITION JOINT

13

precut 2x4 studs if possible and feasible. Using these saves a considerable amount of time and assures you of greater precision than hand-cutting.

There are several methods you can use in framing the walls, but the fastest and best is to pre-frame sections directly on the subfloor. When put together, the sections can be hoisted into place and braced for securing to the joists, through the subfloor, and to each other (Fig. 12).

Studs should be spaced 16 in. on center and endnailed with two 16*d* nails through the sole and top plates. Separate pieces of 2x4 plate should be joined at the center of a stud.

In framing, make a corner post at the end of each side wall by spacing two studs with pieces of 2x4, as in Fig. 12A. When walls are up, this provides a nailing base for interior wall finishing material on each wall.

If desired, you can make stud spacing adjustments to provide an exterior wall stud in correct position for joining each partition. In this way, only one stud needs to be added when the partition is actually erected, as illustrated in Fig. 12B. Most do-it-yourselfers find it doesn't pay to try saving a stud, and will put the two-nailer studs in position wherever called for at the time the partition is built.

Window openings should also be framed in as the wall is built on the subfloor. Locate the window and nail two studs into position, each 1⅝ in. outside the mark for rough opening as called for in the specifications accompanying the window you'll be installing. Then cut the double header pieces to fit between these studs (Fig. 13). Space the two pieces of the header with short pieces of ⅜-in. lath, and nail them together with 16*d* or 20*d* nails. Use 2x4 headers for rough openings up to 3 ft. 6 in., 2x6s for openings up to 5 ft., and deeper headers for wider openings according to the recommendations of a dealer, architect, or engineer.

Locate the bottom edge of the header at the rough opening mark and nail in place. Then install cripple studs as illustrated.

When wall sections are framed, erect them and temporarily brace them in place. Plumb and nail each section to the joists and header, through the subfloor.

Interior Partitions. After the exterior walls are up, frame and erect interior partitions in the same manner, making door openings as in Fig. 14. Then tie the walls and partitions together with the upper 2x4 of your top plate (Fig. 12).

If non-structural fiberboard, insulating, or horizontally-applied sheathing is to be used, shiplap diagonal corner bracing should be let into the studs with a saw and chisel (Fig. 12A). Structural grade insulating sheathing, plywood, or diagonally-applied board sheathing does not require such corner bracing.

Framing the Roof. After the wall is sheathed, you're ready to frame the roof. There are several different roof profiles from which to choose. Most common are the simple gable and the hip roof. The house in this example had a hip roof (Fig. 3A) and the same profile was carried through on the addition by reusing all the old rafters possible.

First step in framing the superstructure is installation of ceiling joists spaced at 16-in. centers. Because these will not carry weight, they can be more shallow than floor joists. Use 2x4s for spans up to 10 ft., 2x6s up to 14 ft., and 2x8s will span any likely width above that. Toenail ceiling joists into the top plate with two 10*d* nails on each side.

Rafter installation will be simple if you have retained dimensions and plan to reuse the old members. Install them in the same manner by which you took them off.

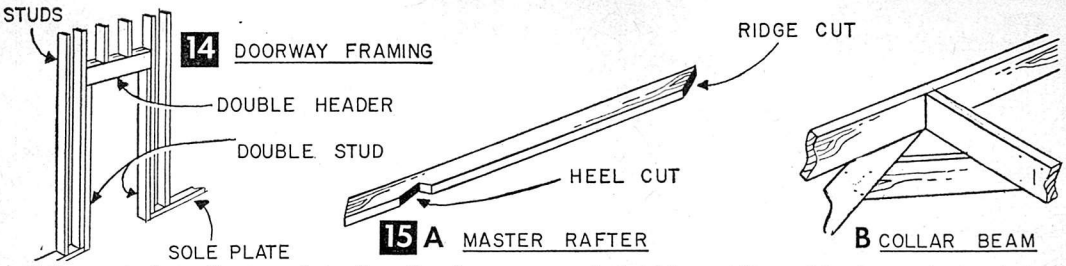
If rafters cannot be reused, you'll need to cut a master rafter (Fig. 15A) carefully to be used as a pattern for the remainder. If you're unfamiliar with use of the framing square, this first rafter will have to be marked by holding it in place, allowing for width of the ridge board.

End rafters should be installed first, flush with the outer edge of the top plate. Install rafters a pair at a time, nailing to the ridge board and toenailing to the plate as you go along, or a metal rafter tie may be used.

The heel (lower) cut of the rafter should sit for its entire surface on the top plate. Rafters are spaced 16 in. on center. If there is a crown in any member, it should face up.

To tie the rafters together, nail collar beams (Fig. 15B) across them about a foot or two down from the ridge board. Use 1x6s for this purpose and cut off their upper corners flush with the rafters.

Next, frame the gable ends with studs notched (Fig. 16) to receive the rafters. Toe-



14 DOORWAY FRAMING

15 A MASTER RAFTER

B COLLAR BEAM

nail these studs to the top plate directly above the wall studs.

Roof sheathing may be ⅜-in. exterior type fir plywood—preferable because of its lay down speed, or shiplap. If you were careful in removing the old decking, you may have practically enough material for covering.

Nail plywood decking in the same manner as that described for the subfloor deck. If boards are used, they should be staggered so that the ends of no more than two to four of them fall on the same rafter. Nail these with two 8*d* nails to each rafter.

Flashing the Roof. Before shingling, flashing should be installed. Strips of non-rusting sheet metal, like aluminum, are used in 18-in. widths at valleys (Fig. 17). The juncture between the new wall and existing roof should be similarly flashed.

Flashing strips that join a roof to a wall horizontally go behind the lowest course of wall covering such as siding and are extended a few inches over the top shingle course of the adjoining roof. Where the roof slopes along a wall to which it is joined, use short strips for flashing, extending each over the one below it and under the adjoining roof shingle.

Shingling the Roof. The roof may be shingled with the material saved—if there is enough of it in good condition, or if the color can be matched. Otherwise, you may choose material coated asphalt shingles, wood shingles, asphalt cement, tile, metal, or roll roofing. For roof slopes of less than 3 in. to the foot, apply built up roofing—successive layers of either tar and tar-impregnated paper topped with gravel, or asphalt and asphalt-impregnated paper.

Before laying asphalt shingle strips, cover roof sheathing with building paper applied horizontally. Each strip should overlap the one below it. Nail a starter strip of roll roofing along the lower edge of a roof to project about ⅜ in. at both bottom and sides. A row of shingles, applied in reverse position may be substituted for the starter strip.

The first row of shingles is applied directly over the starter strip. A pair of nails (1-in. heavily galvanized or aluminum roofing nails for asphalt shingles) are driven just above and to each side of every shingle slot.

Wall Coverings. You have a choice of many kinds of exterior wall coverings—wood planking, siding, shingles, exterior-type plywood, wallboard, stucco, brick, stone, and imitation stone. Siding used in the house illustrated was aluminum, installed similarly to wood siding.

Installation is started at the bottom of a wall. Each piece overlaps the upper edge of the previous one. Overlap varies with the width of the siding. Butt siding up tightly against door and window frames and against corner boards previously installed. Joints of siding should be centered over studs, those of alternate courses staggered.

At windows, siding should line up with the top of the door and window drip caps, and with the lower edges of sills. Aluminum nails, which do not rust and cause streaks, make frequent repainting unnecessary. Aluminum siding also is available and should always be applied only with aluminum nails. Non-rusting flashing is placed over drip caps of doors and windows.

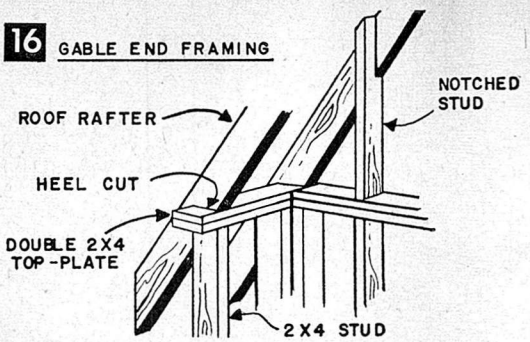
Plywood and wallboard for exterior use can be obtained in the form of large sheets 4 ft. wide, or in the form of wide siding (usually 12-, 16-, and 24-in. widths). The latter may be simply overlapped like regular siding, or the overlap may be accentuated with "shadow strips" placed between overlapping edges.

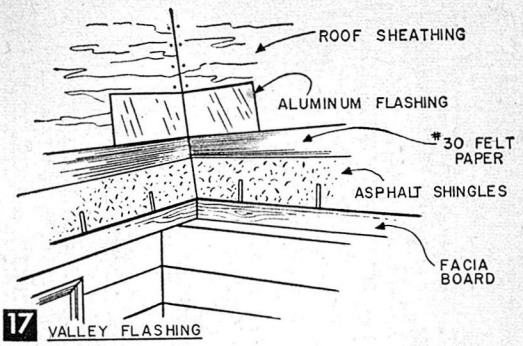
Building the Stairway. After the exterior is completed, the next step is building a stairway to the addition. There are three basic types—a straight flight, L-shaped, and U-shaped (Fig 18).

The example here required an L-shape rise. The owner moved back the wall to extend the living room, and built the stairs exposed to the living room (Fig. 5).

The first step in building such a stairway is to make the landing at the bottom, which constitutes the first step. The base of the landing is made from two pieces 2 x 8¼ in., extending 9¾ in. beyond the inside edge of the 2x4 framing for the partition wall (Fig. 19). This will provide a tread 9 in. wide. Next, cut a piece of 1x12 to fasten to the wall above the first 2 x 8¼-in. pieces. Another 1x12 should be installed against the wall behind each stair stringer.

Next, box in a second step, which makes the landing, of four 2 x 8¼-in. pieces. Set the front pieces even with the inside of the 2x4 partition. Then cut 2x12 stringers with





a notch to fit over the edge of the landing frame, making a rise of 8¼ in. for the first step beyond the landing. At the top, cut the stringers to fit snugly under the bottom edge of the ceiling joists.

Use a steel framing square to mark out the sawtooth pattern for 8¼-in. risers and 9¾-in. tread bases. Make sure that both stringers are marked the same, then cut. Before permanently fastening the stringers in place, erect the bracing as shown. Treads and risers can be purchased from standard stock to fit stringers with these dimensions. They should be nailed with casing nails countersunk into the wood.

Wiring, Plumbing, and Heating. All underfloor wiring, as well as underfloor plumbing and heating extensions, should be finished before the subfloor is laid. Electric cables can be left long enough to be threaded through sole plates of partitions later. After the framework of partitions and ceiling is in place, the rest of the concealed work can be finished. Wiring of rooms should not be added to any existing branch circuits, but should be set up as independent circuits.

Water supply and drainage pipes for a new bathroom generally are extensions of the existing plumbing system. Copper tubing for water supply as well as hot water heating can be installed in partitions easily, and connected to standard pipe with adaptors. Water supply pipes should not be installed in outside walls in localities where the temperature drops below freezing during winter months, unless the pipes are protected with insulation.

To take care of the added heating requirements from an existing system, it may be necessary to increase the size of a hot water boiler, insert a circulating pump, or replace an old gravity type warm-air furnace with one having forced circulation. Or, the new rooms can be served by individual gas or electric heating units recessed in walls or installed in ceilings. In this particular case, extra heat runs were extended to the bedroom addition.

Insulation. Nailing bases for wall coverings should be provided at the time when framing for walls and ceilings is being erected, and before any insulation is applied. Such bases are provided by sole and top plates of partitions, by the framing of doors and windows, by double studs arranged at right angles to each other at corners, and by filler blocks of 1-in. stock nailed to the framing where necessary.

Where two wide panels of wallboard are to be placed horizontally, a 1x3 strip can be mortised into the studs at the point where the panels are to meet. Generally, forms of wallboard known as planking and tile will require furring strips nailed across studs or joists and spaced from 8 to 12 in.

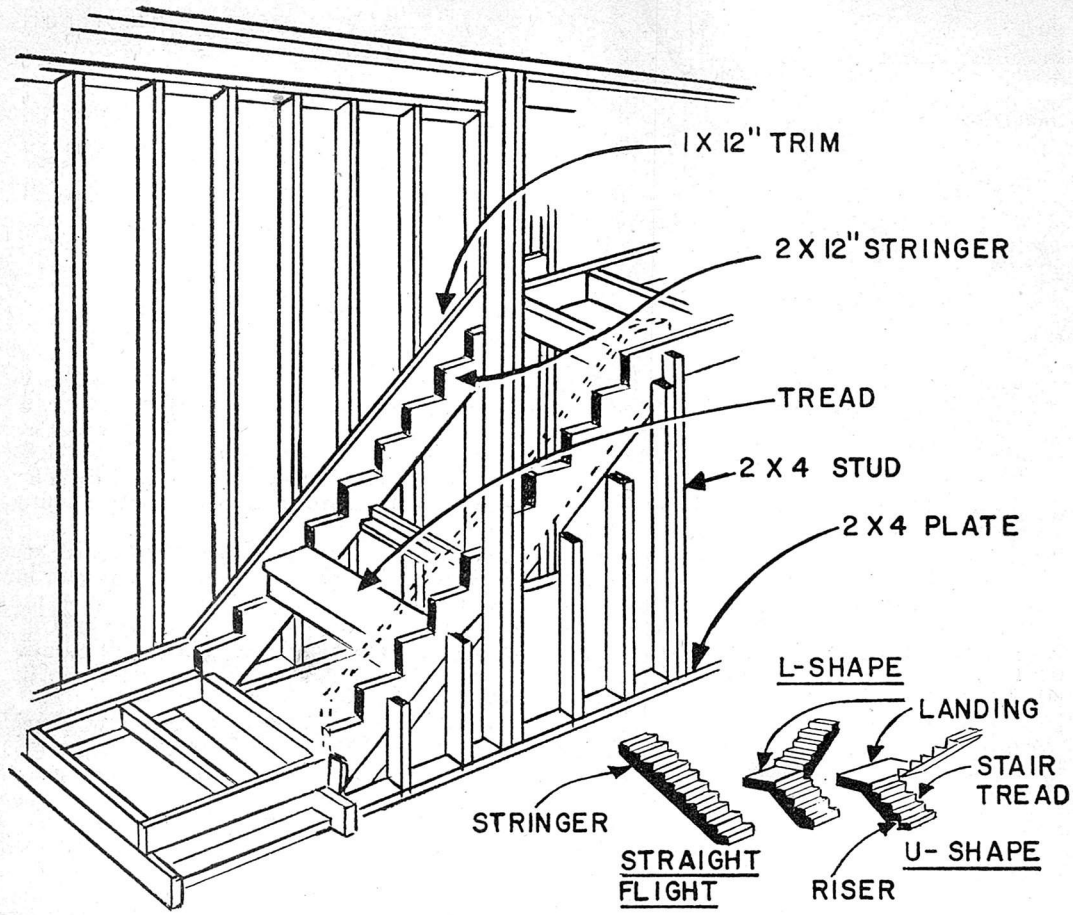
Insulation is installed next. There are three basic types: (1) batt, blanket, or quilt, (2) loose fill, and (3) reflective foil. Batt or blanket insulation usually has a covering that projects beyond the edges for nailing or stapling. Loose fill insulation is poured between floor and wall joists. Reflective foil insulation is nailed or stapled to the joists with the shiny side away from the worker.

Insulation applied between rafters above a sloping ceiling should permit air to pass between the insulation and the roof sheathing, from the unheated spaces at eaves to the space above the attic rooms.

Insulation and vapor barriers generally are installed at the same time, as most types of batt or blanket insulation have vapor barrier coverings. To be most effective, the barrier should be sealed around pipes passing through a wall, and around electrical outlet boxes.

In the case of loose fill insulation, a separate vapor-barrier membrane is required. It should be brought up along the sides of joists and fastened to them with wood strips. Two coats of rubber base paint will serve almost as well as a vapor barrier.

Apply Finishing Materials first on ceilings and then on walls. Dry wall coverings are easy and economical to install, in a fraction of the time required to plaster walls. Such wallboard includes many types of materials in the form of "building boards" (panels 4 ft. wide), planking, and small-size panels, including "tiles." The material may have insulating value, should be tough and rigid, and have



19 STAIR FRAMING

18 STAIR TYPES

great resistance to impact. Some of these coverings come pre-finished in durable, attractive colors, and also are available in various textures.

Fasten wallboard with nails, staples, clips, or with adhesives. Nail and staple spacing vary from 3 to 6 in. along edges, and from 6 to 12 in. elsewhere, as recommended. Some wallboards have beveled edges, which form neat V-grooves when joined. Straight edge joints of wallboards often are filled with a putty or crack-filling compound. Joints, corners, and edges of wallboard may be concealed and protected with special molding of wood or metal. In some instances, these moldings can be obtained in the same material as the wallboard.

Flooring. Besides strip, plank, or block wood flooring, you can have various kinds of composition floors in many patterns and colors or you can use carpeting. Before a finish floor is laid, the subfloor must be smooth and clean so that there are no projecting nail heads or raised edges of boards. Wood flooring is fastened directly to a lumber or plywood subfloor after the subfloor is covered with 16-lb. building paper.

For composition flooring, the subfloor should first be covered with an underlayment of ¼-in. tempered hardboard or ⅜-in. fir plywood. Fasten underlayment to the subfloor with barbed, spiral, or ring-groove nails.

Strip flooring of hardwood or softwood comes in various widths and lengths with tongue and groove edges. Lay the first strip with the grooved edge parallel to the wall, and space it from the wall a little less than the thickness of the baseboard. This strip is facenailed near the grooved edge, then blindnailed at an angle, into the base of the tongue. Succeeding strips are blindnailed only. Flooring nails should be 8*d*, preferably ring-groove or spiral, and spaced about 10 in. apart. Plank flooring may be solid wood or plywood. The edges are beveled, and the boards are screwed and nailed to sub-floor.

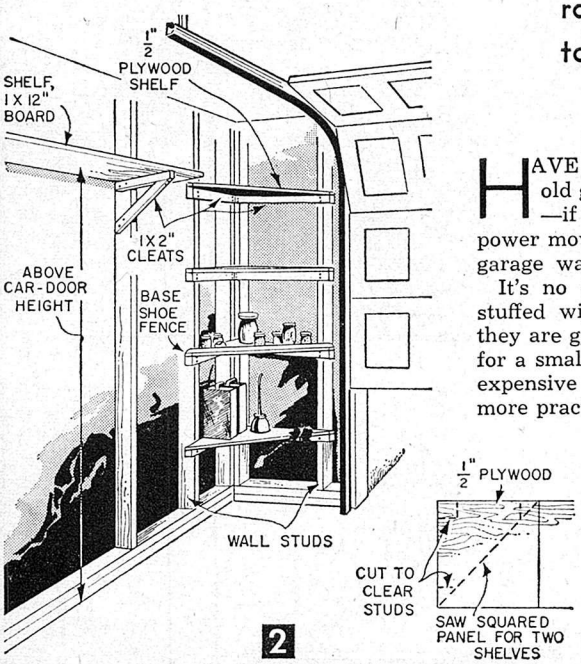
Wood flooring should be laid in the longest direction rooms. This is possible if the subfloor is plywood, or if a lumber subfloor has been laid diagonally. The flooring of adjacent rooms should run in the same direction, and the joints should be staggered.

Four Ways You Can Stretch Your Garage

Photo Courtesy United States Gypsum Co.

Perforated hardboard is the ideal wall covering material for garages because of the wide variety of hooks and brackets obtainable with which items may be hung on the entire wall.

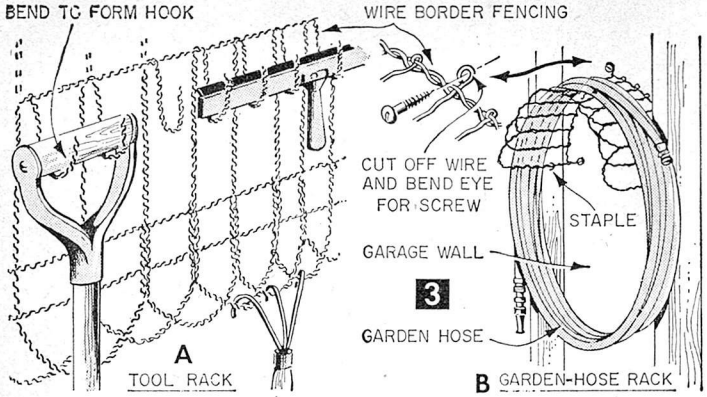
How to expand your car's living room—or add more space for tools, toys and garden supplies



HAVE you tried opening the door of a new car in an old garage? You might make it—at least part way—if you're lucky enough to clear the bicycle, power mower or other paraphernalia stacked along the garage wall.

It's no secret that most of today's garages are so stuffed with big cars and household equipment that they are groaning at the seams. Yet trading in your car for a smaller one, or building a larger garage are both expensive solutions to the problem. Let's look at some more practical and economical solutions.

Using Available Space Efficiently. Before you start tearing down one of your garage walls to enlarge it as in Figs. 6, 7, 8, and 10 or build additions as in Figs. 5, consider the height dimension of your present garage rather than just the length and width of the floor space. Getting the small stuff up off the floor and on shelves or hung up as in Fig. 1 may solve your storage problem. Perforated hardboard with the various



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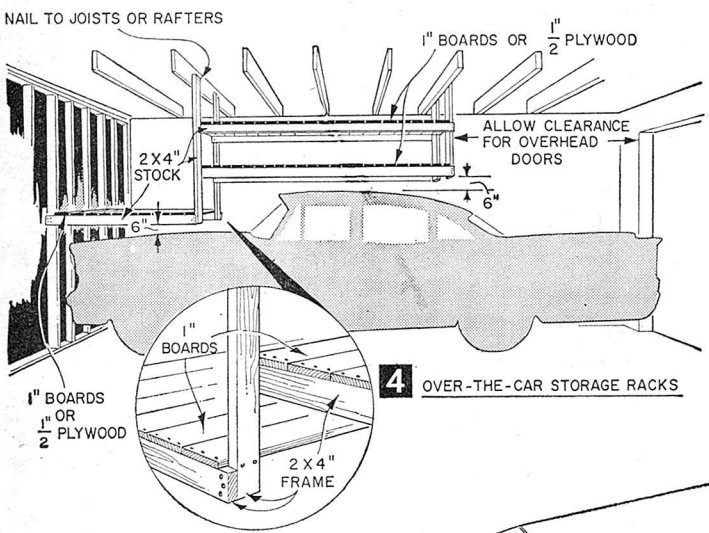


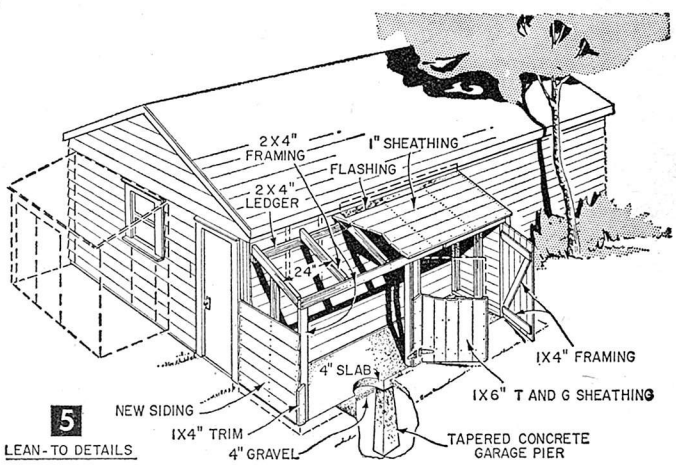
4 OVER-THE-CAR STORAGE RACKS

hooks available make it easy to hang up every hand-held tool for home and garden. Merely nail the perforated hardboard to the garage wall studs or 1 x 3-in. furring strips nailed to masonry garage walls.

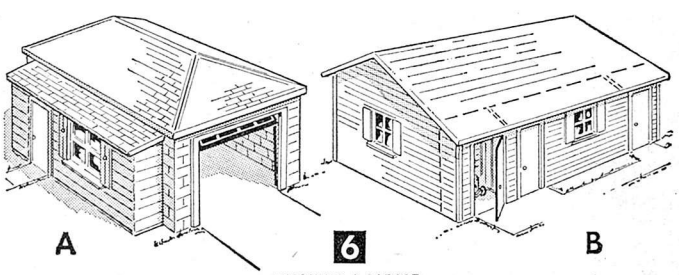
Corner shelves (Fig. 2) will take many small items, yet not be in your way when getting into or out of your car. Make the triangular-shaped shelves of ½-in. thick, sheathing-type plywood and support them with 1 x 2-in. cleats nailed to the wall studs. Shelves above car-door height (Fig. 2) will provide 18 to 20 sq. ft. of storage in an otherwise unused area. Large panels of ½-in. plywood placed on top of the ceiling rafters make good storage places for items like Christmas decorations that are only used once a year. Use a stepladder to gain access and do not load to over 5 lbs. per sq. ft. because the rafters or lower members of a trussed rafter are not designed to be load bearing, particularly in a two-car garage.

To utilize the space between the rooftop of today's lower cars and the garage roof or rafters, build in a series of hanging racks as in Fig. 4. These wide racks or shelves are ideal for screens and storm windows, a currently idle baby crib, lawn sweeper or other bulky items. Use 2 x 4-in. stock for the framing and 1 x 6-in. lumber or ½-in. plywood for the shelving. A 6 ft. length of 16 in. high border-type wire fencing can be used to make a garden tool rack as in Fig. 3A. Bend the wire spikes which are normally inserted into the ground to form hooks and staple the fencing to the garage wall studs. The same wire fencing can be used to make a garden-hose rack by bending it to a semicircular shape and fastening it between the wall studs as in Fig. 3B.

If reorganizing the interior of your present garage does not give you the storage space



5 LEAN-TO DETAILS

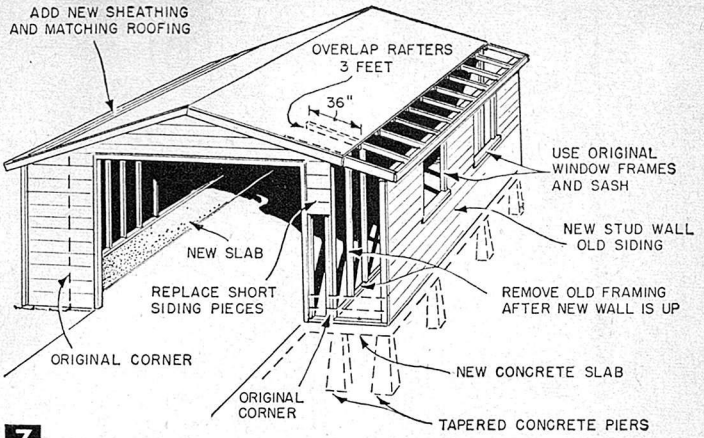


6 WIDENING A GARAGE

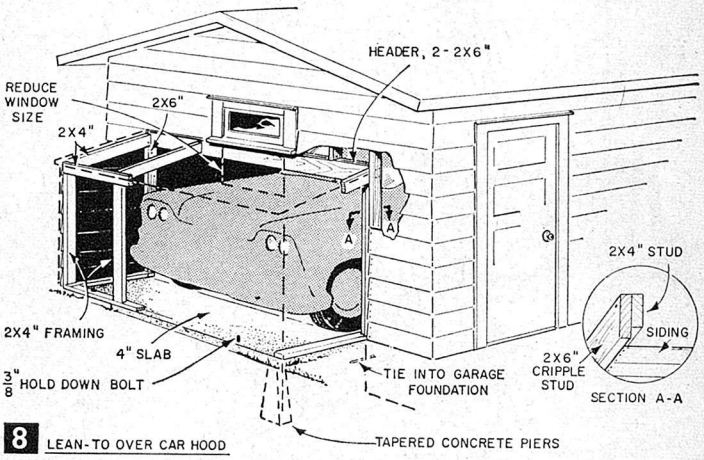
needed, the only solution is to enlarge the garage. In fact, the added convenience of being able to store garden equipment where it is readily accessible without moving the car every time you need it is often enough of a reason for adding storage space.

Add-on, Lean-to Garage Additions. A lean-to built against the garage as in Fig. 5 is about the easiest and quickest method for increasing outdoor storage space. A walk-in lean-to can be built on the side or end depending on how your garage is located. Be sure to check your local building code for lot-line clearance restrictions if you decide to build near the side of your lot.

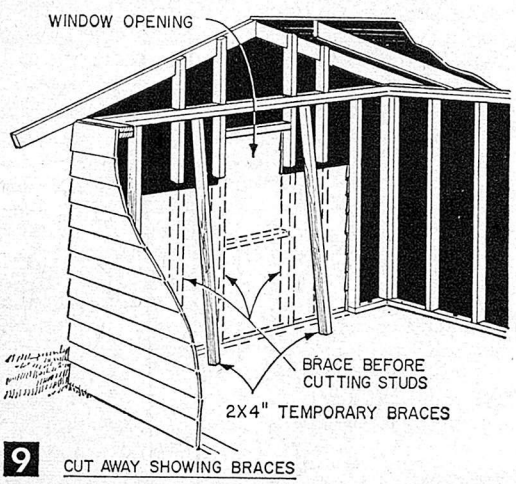
When you have decided on the location and size for the lean-to, dig out the floor slab area. In hard ground, forms may not be necessary if you excavate carefully. Dig it deep enough to take a 4-in. fill of gravel plus the 4-in. concrete floor. In areas where winters are cold, set tapered concrete garage piers every 6 ft. along underside of outside edges of the concrete floor slab (Fig. 5). When pouring the floor, insert ½ x 5-in. bolts around the edges of the slab for bolting down a 2 x 4-in. sill plate. Nail 2 x 4-in. studs to the plate at 24-in. spacing and to the exterior of the garage wall for the lean-to framing. For the roof, nail or lag-screw a 2 x 4-in. ledger to the side or end of the garage with room above it for 2 x 4-in. sloping rafters as in Fig. 5. Cut the rafters to slope toward the outside wall of the lean-to and apply 1-in. sheathing and roofing. Install metal flashing over the joint between the lean-to roof and the garage. New siding around the lean-to should match as closely as possible with the siding of the garage. If you can't match the siding, use an entirely different kind



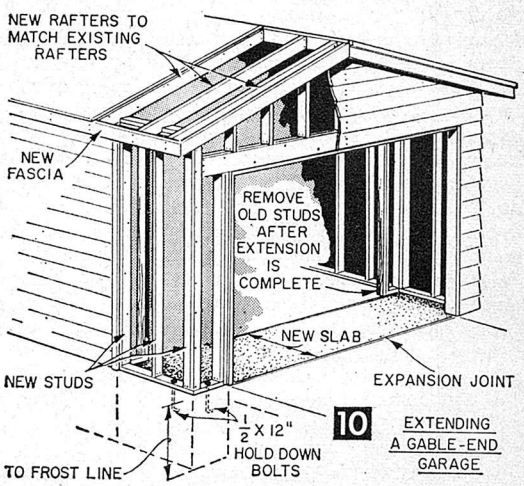
7 EXPANDING BOTH WALLS



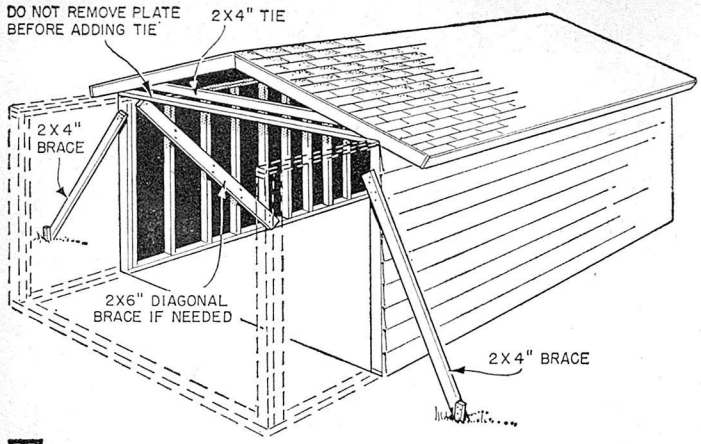
8 LEAN-TO OVER CAR HOOD



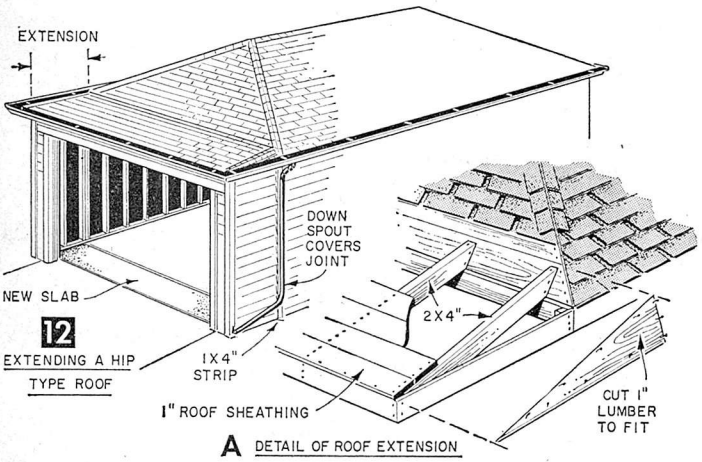
9 CUT AWAY SHOWING BRACES



10 EXTENDING A GABLE-END GARAGE



11 BRACE SIDE WALLS BEFORE REMOVING ENTIRE END WALL



12 EXTENDING A HIP TYPE ROOF

A DETAIL OF ROOF EXTENSION

and make a clean break between the lean-to and the garage. A neatly painted frame lean-to can also be built onto a brick garage without disturbing the overall appearance. Caulk the vertical joint between the lean-to siding and the garage. To visually tie the new addition into an existing frame garage, paint both the same color. Wide doors in the lean-to will make it easy to get at the storage space inside. Vertical siding, nailed together with 1 x 4-in. battens inside make inexpensive doors. Where doors are wide, use heavy strap hinges to support their weight.

Enlarging the Width of a Garage. Not only are the new cars longer and wider, but the car doors are also wider. That means more space is needed to open the car doors when in the garage. Adding a new section (Fig. 6A) or moving out the side wall of your present garage is the only solution to provide the additional space needed to open the car doors when it is parked inside the garage. However, since only the central part of the wider space is needed for opening car doors, you can use the corners for storage space. By installing service doors opening to the outside (Fig. 6B), this corner storage space becomes accessible from outside the garage.

Start by removing the existing siding and sheathing from the wall to be widened. Dig and bury tapered concrete piers and pour a new 4-in. concrete slab floor as in Fig. 7 for the lean-to addition. Use new 2 x 4-in. studs for the wall and extend the same roof line by nailing rafter extensions alongside existing rafters, overlapping them by 3 ft. If the existing siding is removed carefully, it can be reinstalled on the new wall. New siding in longer lengths will be needed for the ends. Remove old framing after new wall is up. If the roof is shingled, loosen the lower rows and slip the new rows of shingles under the existing shingles.

Extending the Ends of a Garage. If your garage is not long enough to store your new car, the additional space needed can be gained by adding to the door end as in Fig. 12 or the far end as in Fig. 8. The type of garage extension to build will depend upon the location of the garage on your lot. The simplest method of extending the useful length of your garage is to cut an opening in the far end wall and build a lean-to shelter to cover the front grille and hood of your car as in Fig. 8. Wall studs holding up the roof must be removed to open up the area. Before cutting these studs, however, install temporary 2 x 4's vertically to block up the roof as in Fig. 9. Then cut through the studs and install a double 2 x 6-in. header across the bottom ends of the cut studs. Support ends of the header with a 2 x 6-in. cripple stud (Fig. 8) that will also provide a nailing edge to attach the siding. If the header cuts through a window, remove the lower part of the window and reinstall the upper half when the header is built in. Build the rest of the lean-to in the same way as indicated for the lean-to storage space (Fig. 5). Remove temporary 2 x 4's after new framing is complete. If you don't care for the lean-to extension, you can extend the full end section for increased storage space or for appearance. First dig and bury tapered concrete piers and pour a 4-in. concrete slab for the new addition. Before removing the full end wall, be sure the structure is braced from all directions (Fig. 11). In most cases the full end wall keeps the garage structure square and straight because the door end provides little bracing support. Remove all studs, sheathing and siding. At the roof line, remove the fascia. Build

on a new corner at each side and splice cap plate onto the existing garage structure. Build a new wall of studs and sheathing using studs previously removed wherever possible. Cut new rafters like those on the existing garage and splice on new roof sheathing. Remove shingles along the extension joint and work new ones into each row. Install new siding to the side walls where extended and reinstall any windows or door that may have been located in the old end wall. Instead of using a stack of short siding pieces at the ends of the side walls, you may want to consider recovering the entire wall surface with cedar shakes or asbestos cement shingles. A completely new overcoat layer helps to make the garage look as if it had always been its new and larger size. A new coating of paint all over the garage will tie in the addition to the main garage.

When the garage space is part of the house and a simple end extension is not possible, the only solution left is to build out from the front or door end of the garage. This extension is more troublesome because the garage door must be relocated. However, many of the older garages that are too small for today's cars were built with swinging doors. If yours is one of these old-timers, why not extend the front end of the garage and install an easy-to-use overhead door at the same time.

To extend a simple gable-end garage (Fig. 10), first remove the fascia from around the roof and the front end siding, and the doors and sheathing. Leave the studs until the rest of the extension is completed, since they are short and probably can't be salvaged. Pour a new concrete floor as mentioned above. Build new stud walls and add one or two additional rafters to extend the roof. As long as you are extending the front end, it is often just as simple to add as much as four or six feet additional length to provide for more usable storage space. Add on roofing, wall sheathing and siding as for the other types of additions.

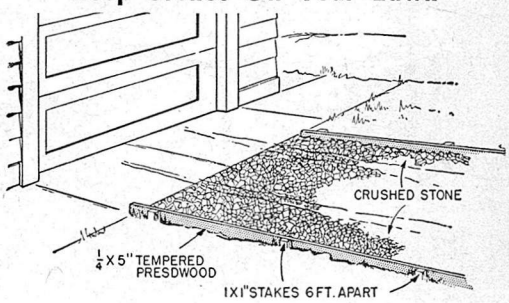
A variety of overhead doors, either the roll-up or fold-up type are available. Frame the door opening to the size necessary to fit the door you select, then install the door according to the instructions.

Where a hip-type roof covers an existing garage, an extension cannot be tied-in simply. Here, the simplest solution is to build on a new section and cover it with an almost flat roof (Fig. 12). Because of the difference in roof lines, the extension should be kept as short as possible. Build stud walls and add short 2 x 4-in. rafters and sheathing. Apply a built-up roof of saturated felt tucked up under shingles on existing garage. Add shingles to match existing roof or reshingle entire roof. An overhead door can be installed in most of these extensions, but make sure there is enough overhead space available for the type of door selected. The roll-up type doors usually require more overhead space than the flat one-piece that swing up and into the garage over the car.

While these ideas for extending your garage are mainly applicable to frame garages, a frame extension can also be built onto a brick garage. If the garage is solid brick and/or concrete block construction, the easiest solution is to build on a completely new frame addition at the door end. A neatly painted frame building will complement a brick garage just as many houses are built with a combination of brick or masonry and frame construction. Wherever possible leave the brick structure undisturbed and simply build on the frame portion.

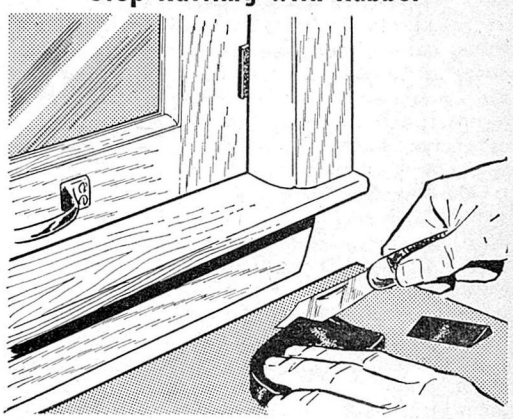
When the garage is of brick veneer construction, the brick exterior can be removed and the addition built onto the frame structure. New brick veneer can then be applied around the outside of the new extension to match the existing garage. If the brick can't be matched, try using a complementary stone. Or the new extension can be covered with siding and painted just as with the solid masonry construction.—M. E. Dowd and D. M. Swartwout.

Keep Stones Off Your Lawn



• If you have just moved into a new subdivision, you can keep the crushed stone from the driveway or street off your front lawn by nailing long strips of Masonite ¼ x 5-in. Tempered Presdwood to wooden stakes spaced at 6-ft. intervals. Prime and paint stakes and strips white or in colors to harmonize with your house.

Stop Rattling with Rubber



• For relief from rattling windows, fashion 1- to 2-in. lengths of rubber cut from a shoe heel into triangular-shaped wedges and press into the cracks.

A Stone Foyer

Natural stone or tile makes a distinctive entryway which dresses up your home and adds far more to its value than the cost of materials plus labor.

Now you can have a genuine stone entryway floor without an expensive concrete foundation. Hearths, patio entries, other stone floors, too

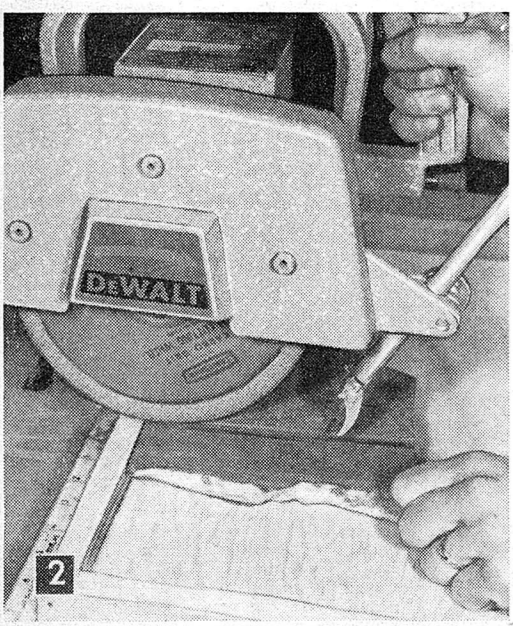
ASK a contractor about putting a stone floor in your house, and he'll start talking a 2-in. concrete bedding plus major structural changes to support the added load and compensate for the extra thickness. The price will make you want to forget you even asked.

Here is a new method—one you can do yourself—that neatly sidesteps these problems. No structural changes are needed if you have a sound floor. And the price is reasonable.

You come out ahead three ways. 1, You can pick stones smooth enough and flat enough to lay directly on the wood subfloor. 2, By using ceramic tile techniques you avoid the thick concrete bedding required to set and mortar irregular shaped stones. And 3, Epoxy concrete, a new material foreign to both masonry and tile work, gives you sound, non-cracking joints.

You can give your floor real personality by using colorful and meaningful stones picked up on your travels. Fool's gold, crazylace agate from Mexico, petrified wood, and jasper from the Pacific Northwest decorate this floor. A trip to the salvage yard yielded smooth-faced marble from a century-old soda fountain and large pieces of slate from old school house blackboards.

Thin stone is available from dealers. Ideal kinds are Colorado red flagstone, beautifully patterned Crab Orchard sandstone from Ten-



Carbide particle wheel in radial arm power saw smooths bumps and cuts down stones. Wooden box ¾ in. deep made from scrap lumber protects saw table from scratches. To fit pieces, score stone with carbide wheel and break like glass by tapping with hammer.

for Your Home

nessee, and colored slate from Vermont and Pennsylvania. Don't overlook the tan and buff Arizona sandstone. Avoid limestone which is too soft to work nicely. Common quarry tile makes for easy working as does the sheared, smooth Colorado flagstone called "patio blocks." Whatever stone you choose, even if you have to buy all of it, the cost should not exceed 50¢ per sq. ft.

Decide first the area you want to cover. When you remove existing surface flooring, most houses have a ¾-in. height difference between subfloor and other flooring. This determines the maximum thickness you can use.

Sort dealers' piles with calipers for slabs within your maximum. Thinner pieces are fine. They can be shimmed up to the right height. Flatness is your key requirement. Attractive slabs that are flat within ⅛-in. make a safe, good-looking floor. Thicknesses of ⅜, ½, ⅝, ¾, ⅞, and 1 in. are easy to find. Check each piece for flatness by laying it on a flat surface and testing for rock. Pick stones without cracks which show no signs of splitting or lamination. Minor bumps or hollows can be corrected if size and pattern are good.

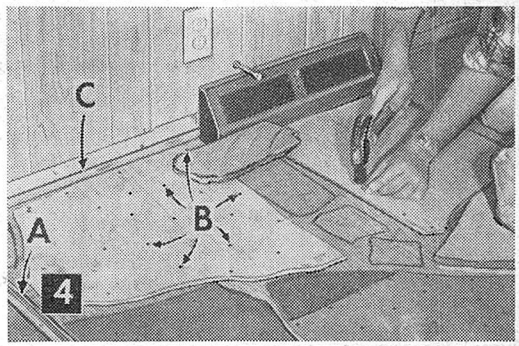
Souvenir stones which are rounded or thicker than required can be cut down with a carbide particle wheel on a radial arm power saw (Fig. 2). Or use a coarse rasp, disk sander, or carbide grit grinding wheel to remove high spots.

Lay plastic film or other material on floors around work area to prevent scratches. If subflooring is loosely nailed, renail it to make a solid joint with floor joists. Drive 1½-in. ring-shank nails at 2-in. intervals. If there are large gaps between floor panels or the floor is weak, reinforce it by nailing and gluing panels of ½-in. plywood between the joists underneath subflooring. Cure flexing caused by inadequate support by inserting additional floor joists between existing ones and installing a jack pole in the basement.

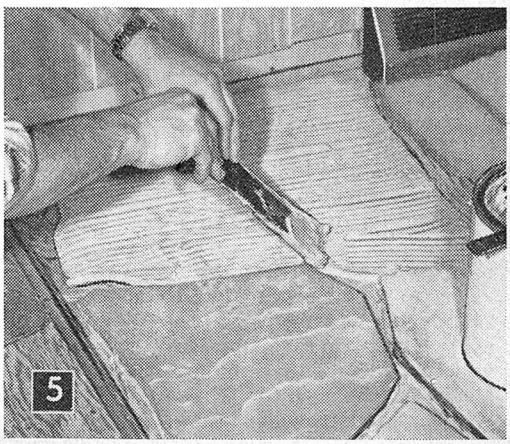
Level strips of ¼-in. Masonite or plywood the thickness of the stone nailed along walls allow even strikeoff of the mortar (grout). Mark strikeoff height on door sills in pencil.

Shim material raises stone to finished height. Cover entire area if stone is too thin to match floor height. For example, match ⅝-in. quarry tile to 1-in. floor height with ⅜-in. plywood shim, securely nailed down.

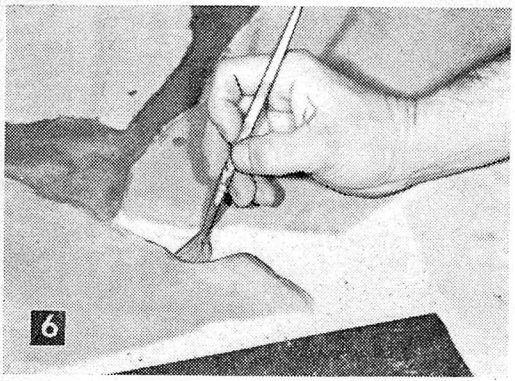
Plywood shims jigsawed to the same size and shape as paving stones hold up the thin pieces to make level floor. Pieces only ⅛-in. thick will not crack when supported this way. Rock shops sell colorful stone slices.



Mark shim location when positioning stones. Note aluminum angle divider (A), close nailing pattern on shims (B), and level strip to make mortaring easier (C).



Ceramic tile mastic spread with toothed applicator holds stones. Step on each stone several times during first few hours of 24-hr. drying period for solid bond.



Epoxy concrete fills shallow grout joints between floor stones. Mix small amount of epoxy to consistency of thick paint and apply with paint brush.

If you cover an area larger than 5 ft. square, divide it with aluminum angles screwed down. Make sure leg height does not exceed stone thickness or it will show on finished floor.

To use stones of different thicknesses, shim each one to the level of your floor with plywood cut to shape (Fig. 3). Support irregular pieces of stone with ring shank nails left sticking out far enough to hold up the hollows in the stone. Minor depressions and larger areas less than 1/16 in. deep require no special supports.

Before laying stone permanently, clean it with a wire brush. Use a blunt chisel to remove split or loose edges and scale. Wash with water to remove dust. While stone is drying, sweep and drymop floor, nail down shims, and wipe clean again. Brush on a thin coat of ceramic floor tile mastic to seal area against water absorption.

When dry apply more mastic liberally with a coarse-toothed spreader (Fig. 5) position stone, and force it into the mastic. Walk on it several times while it dries to make sure each stone is fully seated.

While waiting for the mastic to dry, drive ring shank nails at 3-in. intervals in gaps between stones. Nail heads should project to half the height of stone surface. Nail heads hold mortar grouting solidly in place and prevent its lifting.

Conventional mason's mortar mix is used to grout joints. Soak surface with water to prevent stone from soaking up water while concrete sets. Sponge applies water and soaks up puddles. Dash concrete into joints with a small trowel. Make sure it goes under cleft edges and around nail heads. Drag joints with wet sponge to finish. Also sponge concrete from stone faces. Sponge dragging recesses joints about 1/8 in. and brings coarse material to the surface. This forms an ideal surface for epoxy concrete. It also prevents streaks which can appear on finished floor if mortar is allowed to dry on stone faces.

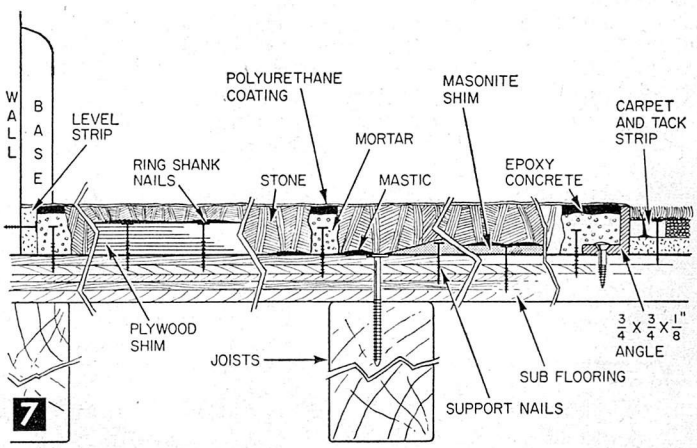
Clean stone to bring out color and improve bonding. An 8-to-1 mixture of water and muriatic acid does the job. First soak floor with water to prevent acid from soaking in. Wear rubber gloves. Apply acid with a clean cloth and scrub in. Sponge off several times with fresh water to rinse away the acid.

Epoxy concrete is a very fine grained synthetic concrete that dries fast and sticks to practically anything. Unlike conventional concrete, thin coatings adhere well and resist cracking. Sherwin-Williams "Loxon" was used for the job shown. Mix it according to instructions and apply carefully with a paintbrush as shown in Fig. 6. Use two coats to build up the required thickness.

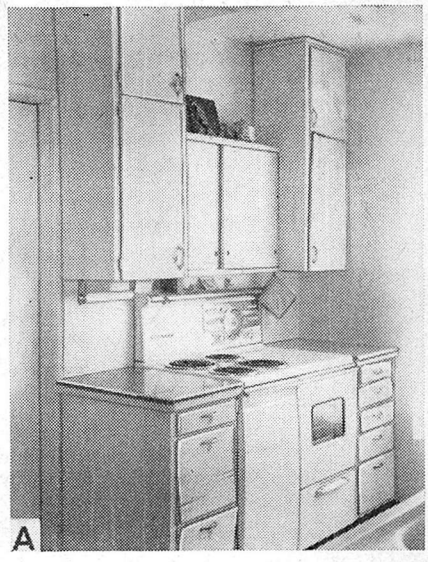
When it sets, sand joints and stone edges with coarse, cloth-backed emery to remove sharp edges. Epoxy joints look like molten glass poured over the mortar grout.

Finishing touches on your stone foyer include another washing and two coats of polyurethane plastic "varnish." Monsanto "Rex" Super Satinwood was used to produce a tough, clear, bubble and brush-mark free surface. Non-skid floor wax forms final surface. Lastly, you can replace the base moulding to finish the job.

Maintaining your stone floor is simple because it is water proof. Wet mop plus buffing and rewaxing as traffic requires does it. Repair deep scratches by sanding through coating and scratch with fine grit paper, and recoat. Patch joints with epoxy concrete.



Cross section of finished stone floor shows details of construction used.



New finish applied over old cabinet surfaces transformed these drab units into bright looking hardwood cabinets that make the kitchen a showplace for modern living.

Face-Lifting DRAB CABINETS

Instead of applying the conventional enamel coats over the cabinet, cover the old surface with a finish that adds a modern touch

By EDWIN M. LOVE

PUT new life into tired and worn looking wood or metal kitchen cabinets by giving them a new finish that displays the warmth and beauty of natural grain and the color of modern hardwood.

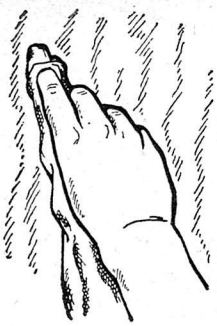
Prepare the old surface for a new finish by washing with a detergent solution, then putty any cracks and sand with 3/0 garnet paper.

One Method of Finishing the cabinet is to apply a light colored enamel undercoat over the old surface, then cover this with a darker color. Wipe the final finish with a cloth before it dries as in Fig. 2, so that paint is mostly removed from the broad areas but left in angles and crevices.

By wiping the surface you impart a varying tone that relieves the monotony of a uniform color. This finish is not wear-resistant, so protect it with a coat of clear plastic varnish.

Create a grain effect on the old surface by making streaks in the second color as in Fig. 3. Use a fine wire brush to give a

2 WIPE FINAL FINISH



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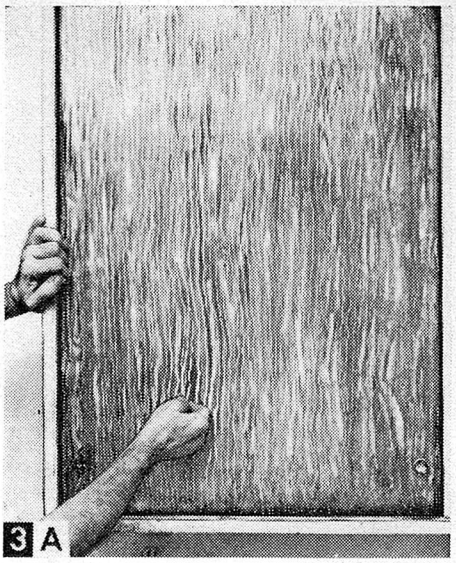


3 A

Final coat of light brown glaze was streaked by rubbing with a cloth, then grained by scratching wavy lines with a toothpick.

porous effect, and scratch wavy lines (Fig. 3A) ⅜ to ½-in. apart with a toothpick. When dry, sand lightly and apply a clear plastic finish over the entire textured area.

Repair Warped Doors that will be painted or covered with an overlay by making saw kerfs half-way through the hollow side of the material as in Fig. 4. Drive glued wedges into the kerfs to straighten the plywood, then fill in any openings with plastic wood. Plane and sand the surface smooth before painting.

Warped drawer fronts can be pulled flat with furniture clamps stretched from front-to-back, or with a jig as in Fig. 5. Drive in the wedge to bend the front so it fits flush with the sides and hold in place with finishing nails or ¼-in. dowels.

Flush doors can bind because of loose screws or because the hinge joint is too wide (Fig. 6). If hinge bound, insert a cardboard shim towards the front to decrease the hinge joint. With surface hinges, glue match sticks or dowels into the screw holes and drill new pilot holes to bring the door into alignment. If the hinge is bent, remove and hammer back into shape.

Restore shrunken doors back to original size by gluing and nailing strips to the sides and planing flush when dry. Remember that when refitting the door the latch edge must be beveled to allow for opening and closing clearance.

Altering Cabinet Construction often solves door alignment problems. Installing a center support between meeting doors, or a rail to separate doors with butt ends will increase support and make faults not so noticeable.

Center supports can be made from solid stock or, in the case of hardwood cabinets, from plywood. When center supports are used, the doors have to be rabbeted so the inside width is ⅛ in. less than the opening, which gives you 1/16-in. clearance on each side of the door.

After you cut the rabbet, smooth the sides of the groove with a flat wood rasp. Rounding off the edges can be done by hand or with molding heads in your bench saw if several edges have to be worked.

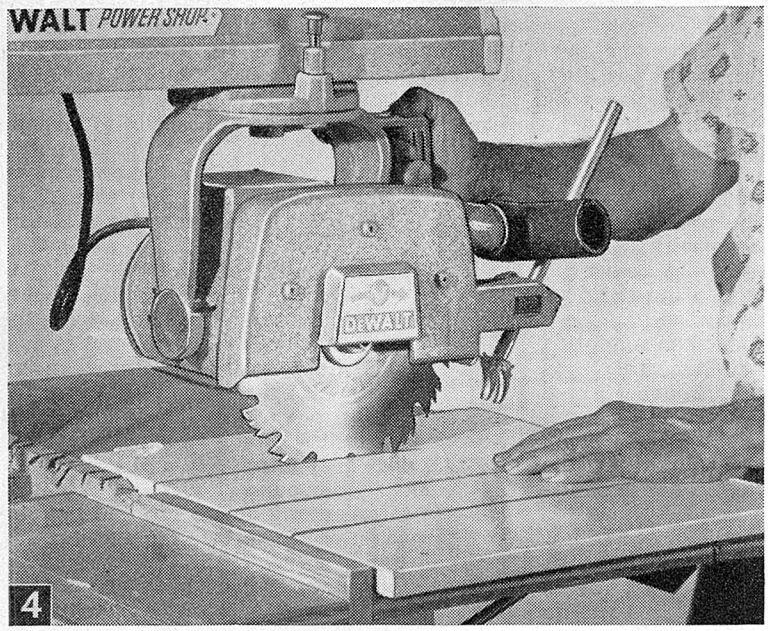
Loose Drawer Slides can cause a wide gap to appear at one end and perhaps part of the front to project or go behind the face of the cabinet when the drawer is closed.

Correct this drawer problem by installing a center guide (Fig. 7) that is attached to the drawer rails. This guide, which is chamfered at the front, should project enough above the rails so the drawer bottom slides on it.

Square off the corners of the drawer, if necessary, then position the drawer over the guide and mark off the location of the guide on the bottom. Position the guide strips on the lines (Fig. 7A) and attach to the front and back with finishing nails, and to the bottom with glue. Wax the guide and strip groove so the drawer will slide freely.

Change Flush Doors and drawers into lip-type units by facing them with ¼- or ⅜-in. plywood that projects over the old surface by ⅜ in. Glue and nail this plywood overlay in place. Use either semi-concealed or surface type offset hinges on the doors.

Transform painted cabinet surfaces into a wood-grain finish by facing them with ⅛-in. thick, three-ply ash, birch, mahogany, or other hardwood veneer that can be purchased in 30 x 84-in. sheets. Most of these overlays are bowed and are best cut to working sizes with a handsaw. Mitering is impractical. Apply the overlay to old enameled or latex



Straighten a warped door by sawing kerfs half-way through the material at right angles to the curve on the hollow side, then drive in wedges. Some cuts can be made diagonally.

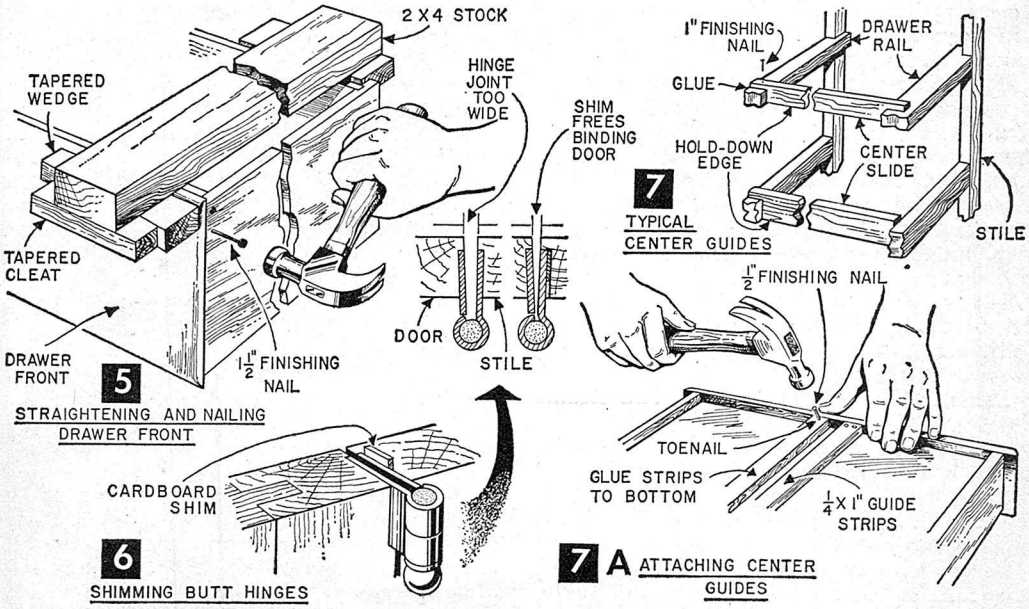
coated surfaces with white vinyl glue, such as *Wilhold,* or contact cement.

To determine if the paint will hold the glued overlay, glue and clamp a plywood block to the surface of the cabinet and let it dry overnight. When you knock it off with a hammer, about half the block should part between the plies and half come loose with paint adhering to it. In this case it is safe to glue over the paint. If, however, the block comes off in one piece, with paint attached to the entire glued area, then you should take off the paint with a remover.

Cut the overlay pieces for flush doors and drawers ⅛ in. larger to allow for errors and finishing. The projected edges can be planed flush after the glue dries. Facings for lip-type members can be ⅛ in. smaller, as the ends will be rounded to shape.

Use glue to attach the overlay to doors, drawers, and other surfaces that can be laid flat as the adhesive dries; use contact cement for vertical surfaces where the adhesive will be applied to the facing surfaces.

Fit the Overlay for the cabinet ends (Fig. 8) by holding an oversize sheet in place over the area to be covered and use a carpenter's scribe or compass to draw a line that duplicates the irregularities in the wall. Undercut



the line as you saw it to shape.

To install this piece, sand the enamel surface on the cabinet with ½ garnet paper, dust, and coat both the cabinet and overlay with contact cement. Use a hardboard paddle to spread the mastic evenly on the facing surfaces.

Let the adhesive dry until a glossy coat appears and a paper can be pressed against both surfaces and lifted away without sticking. A second coat of adhesive may be needed on the porous overlay to attain the required overall glossy consistency.

Work from Back to Front when mounting the overlay on the cabinet. Place the fitted end of the overlay in the groove formed where the cabinet meets the wall and use your finger to press it to the adhesive along the edge of the cabinet. Then position the other ends and press the two adhesive surfaces together.

If the cabinet contains dishes or other fragile kitchenware, use a paper hanger's roller or a caster with the stem set into a dowel to roll the overlay on. If there is no danger of breakage, pound it on with a rubber mallet or cushion the blows from a hammer with a thin magazine laid on the overlay.

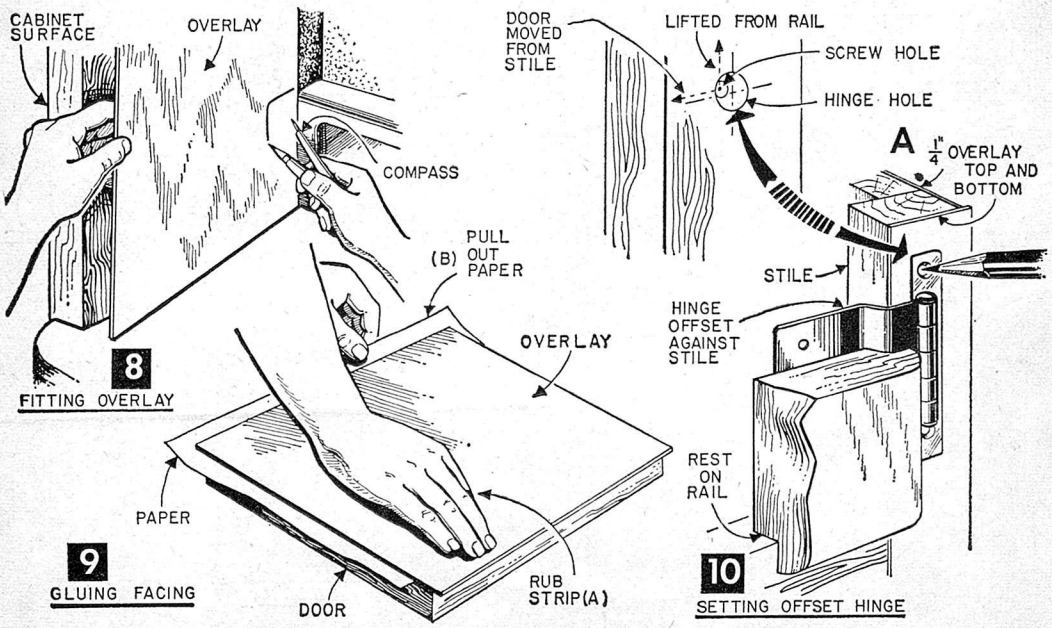
To Glue an Overlay on a door, prepare the surface and apply the adhesive as you did with contact cement, then lay the door on a flat surface and press the overlay in place. To ensure an even bond, cover the overlay with newspapers and pile at least three layers of bricks over the entire surface of the finishing material.

When using contact cement to attach the overlay on the doors, insert craft paper between the members (Fig. 9) so the mastic coated surfaces will not stick until you have them in the right position. Draw the paper back from the edge after accurate placing and apply pressure to join the two members. Withdraw the paper in stages and apply pressure to tack the overlay in place. Finish by rolling or pounding the surface for a lasting bond.

Hinges Can Be Replaced in the original holes or relocated, the old screw holes being filled with plastic wood. When rehanging the doors (Fig. 10), scribe the stile holes and drill the pilot holes so the screws, when being driven in, will lift the door and move the hinges slightly away from the stile edge.

Cover the stile with a strip of overlay that is flush with the inner edge and projects ¼ in. over the outer edge (Fig. 10A). Allow at least ¼ in. overhang at the top and bottom. Use contact cement to attach the overlay, and plane flush when dry.

On the overlay I put on my cabinet (Fig. 1), I applied three coats of *Deft,* with two hours drying time between coats. To conceal the rounded door and drawer edges, the grain was scribed on the plastic wood filler before finishing with a brown pencil, continuing the pattern of the face grain. Where old plywood edges showed, they were sealed with a coat of lacquer closely matching the finished wood color before using a brown pencil. After drying, the Deft was rubbed to a sheen with 4/0 steel wool. Install pulls and catches on the doors and drawers after the cabinets are finished.



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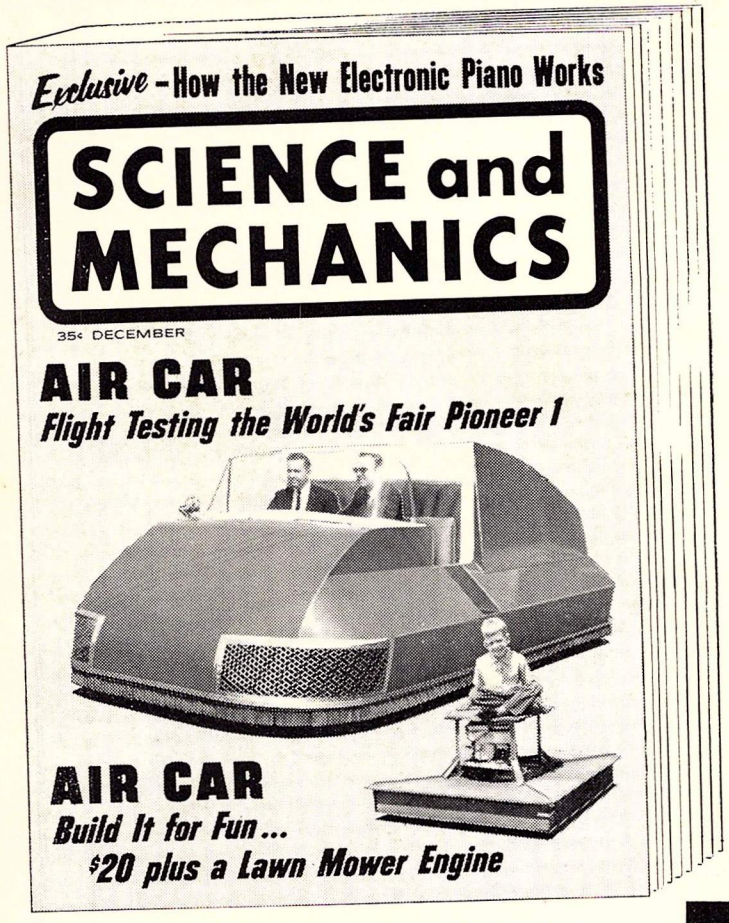

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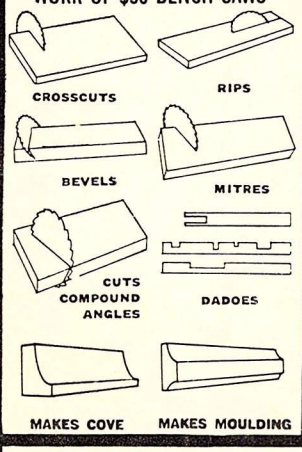

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